

GAME BIRDS

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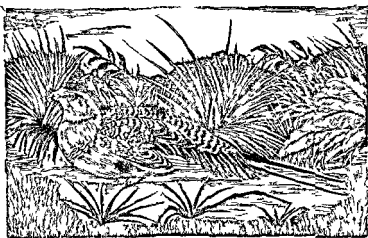
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etc

WITH WOOD ENGRAVINGS

by

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PREFACE

SHAKESPEARE wrote "All the world's a stage" I prefer to regard the earth as a nursery—a nursery, created for the benefit of God's children—unstintingly stocked with toys. Some of these are animate, others inanimate—all are designed for the instruction and amusement of man. Their variety is infinite. They are adapted to every taste. Among the most beautiful are the birds and flowers. For some men these gems have no interest; to others they afford unending pleasure. To many the game birds are the most alluring.

Even as some children find the breaking of man-made toys an exhilarating pastime, while others prefer to play with them and try to understand their mechanism, so men behave towards God-made toys. Some are content to shoot them. There is no harm in this: these playthings are not made to endure for ever, and the supply is boundless. This, however, is not the only mode of enjoying them—nor even the best. The study of their exquisite beauty, their wonderful structure, their minds, their alluring ways and the attempt to find out how they are made and to wrest from them some of their secrets, bring happiness more pure and more free from alloy than that afforded by any other pastime. It is hoped that the short accounts of British game birds that follow will bring home this truth to some who have not realised it.

At present we know but little of the feathered creatures, but our store of knowledge is increasing. Nobody who has not tried the experiment can appreciate the joy that comes to him who has discovered one of nature's many secrets.

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PART I

GAME BIRDS IN GENERAL

CHAPTER I

CHARACTERISTICS AND CLASSIFICATION OF GAME BIRDS

A "GAME" BIRD or beast is one which is shot for sport. As men's ideas as to what constitutes sport vary greatly, "game" is a very indefinite term.

In the most restricted sense, that in which it is used in the Poaching-Prevention Act, 1862, it means hares, rabbits, pheasants, partridges, heath or moor game, black game, woodcock and snipe.

In the widest sense game includes practically every winged creature and many four-footed ones.

Continental sportsmen put a wide interpretation on the term, so do some Englishmen. Mr Robert Blakey's little book, *Shooting*, contains a chapter entitled "Shooting of Small Birds." The birds dealt with therein are redwings, fieldfares, song thrushes, missel thrushes and skylarks. In justice to the author I reproduce the opening paragraph of the chapter: "We confess to feeling some *compunctions of conscience* in writing this chapter. If we were to consult our own sentiments, and make them the standard of other sportsmen's amusements, we should say, Never fire a shot at any of the birds herein mentioned. As lovers of nature, and of all that animates the hedgerows and the fields with their presence and their song, we have a strong dislike to be the instrument of destruction to what have all our lives been objects of interest and pleasure. We know that this is not in strict accordance with the sporting code, and if our principle were legitimately carried out, it might put, perhaps, an end to all shooting. We see the logical dilemma, and feel its force, but still we cannot altogether conquer our internal emotions, and so continue to do what men in almost all departments of life continue in some measure to do, from the antagonistic elements of human nature—to feel one thing, and do the contrary."

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Personally I refuse to shoot, or recognise as game, any song bird, any wader except snipe and woodcock, and any waterfowl save swans, geese and the edible ducks. I confess to having shot pigeons occasionally; these, however, are not included in the present work, because it purports to treat of only the birds which the most fastidious sportsman lays himself out to shoot.

From the foregoing it is apparent that it is impossible to define exactly the term "game."

It is submitted, however, that no creature should be deemed a game bird unless its habits are such that the shooting of it calls for the exercise of skill and some knowledge of its natural history; further, it should afford good eating and be of such a size as to be worth the trouble of plucking and cooking. Possibly those whose means are small would add that its market value should be at least equal to the price of a cartridge. Many years ago in India I went out after duck with a Eurasian subordinate. In the course of our wanderings a snipe rose near him. He made no attempt to shoot it. Upon my asking why he had not fired, he replied: "I don't waste a cartridge that costs more than an anna on a little bird like that!"

Provided a bird have the above-mentioned qualities it comes within the category of game, no matter to what family it belongs. In point of fact, all birds shot as game by true sportsmen belong to one or other of four or five families, because these are the only ones that contain species having the necessary qualifications.

If, after a day's mixed shooting in England, a man, who knew the names of no game birds other than the duck, snipe and pheasant, were asked to sort out the bag and place in one heap all the duck-like birds, in another all the snipe-like ones, and in the third all the pheasant-like fowls, that man would without hesitation, put in the duck pile the mallard, pintail, teal, pochard and widgeon. On the snipe heap he would put the woodcock, full and jack snipe. The partridges, ptarmigan, black game, grouse, capercaillies and quail he would lay on the pheasant pile, probably with some misgiving, thinking, perhaps, that they should be placed on a fourth heap, or indeed that the ptarmigan, grouse, black game and capercaillies should form a fifth pile.

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The man in question would have sorted the contents of the bag correctly.

The object of scientific classification is to place all closely related creatures in the same group or class.

Even as every man is believed to be descended from a common ancestor—Adam, so is every bird believed by the majority of zoologists to be the descendant of a primitive ancestral fowl, every species from an original feathered creature which became extinct long ago. Its descendant species have split up into others, these again into more, until we have to day thousands of species, all related; some closely, others remotely.

Even as there are races, clans, families and individuals among men, so among birds and animals are there orders, families, sub-families, genera and species.

The problems zoologists set themselves to solve are the determination of the proper relationship of all the various species, and the placing of each in its proper genus, family and order. As there are no genealogical tables to refer to, this is no easy matter. All that can be done is to consider the anatomical features of each bird and then make a guess at its position in the family. In these circumstances it is not surprising that zoologists often differ among themselves as to the relationships of certain species. Fresh anatomical discoveries lead to the changing of the position of a bird.

Thus the classification of birds is in an unsettled state, and nomenclature, being dependent on classification, undergoes changes which may not unfairly be described as kaleidoscopic.

Every bird has at least two names, one denoting the genus to which it belongs and the other the species. When it is determined to change the genus of a bird, its name has of necessity to be changed.

One of the difficulties encountered lies in the fact that species and genus, although scientific terms, are incapable of exact definition, they are largely matters of opinion.

A species consists of all individuals which resemble one another very closely in colour, size and structure, exhibiting only such differences as are displayed by children born of the same parents.

A genus is a collection of species which, though each differs from

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the other, show closer resemblance to one another than to any other group of species.

Most of the trouble in classification is caused by these genera. One or other of them is being changed almost daily. The tendency is to split up genera. Thus a century ago the following, among others, of the common ducks were considered to belong to the genus *Anas*: mallard, teal, wigeon, pochard and tufted duck. To-day the mallard alone of these is held to be a member of the genus *Anas*, the teal is deemed to belong to the genus *Nettion*, the wigeon to the genus *Mareca*, and the pochard and the tufted duck to the genus *Nyroca*. Thus, in the last century, the generic name of four of these species has been changed, sometimes more than once.

Until lately species were subjected to far less splitting; nevertheless there have been changes of specific names, because the same bird was named differently by various zoologists unknown to one another. The rule in such cases is that the name first given is to prevail, no matter how unsuitable, even if it has been out of use a century.

Of recent years classification has become more detailed; even as genera have been split up, so have species become divided into sub-species. Many species of wide range exhibit local peculiarities, and it is possible to point out local races having certain features in common and differing from those of individuals in other localities. These local races may be described as incipient species. The modern systematist calls them sub-species and names them. This he does by giving each three names, the first denoting the genus to which it belongs, the second the species, and the third the sub-species. Thus the teal found in Great Britain is styled *Nettion crecca crecca*.

All this is very disconcerting to the sportsman, and he in his bewilderment is apt to exclaim: "I am peppered with these names; a plague on them all!" In the present work no notice is taken of sub-species.

Although many scientific names have an uncouth appearance, a considerable proportion of them denote some feature of the bird. Thus the name *Lagopus* (hare-footed) is given to a group of birds of which the legs and toes are covered with hair-like

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feathers. The red grouse, the ptarmigan and the willow grouse are among these. As the red grouse is confined to the British Isles, and Scotland is its main habitat, it has been given the specific name *Scoticus*, and is called *Lagopus scoticus*. The ptarmigan is called *Lagopus mutus*, apparently the zoologist who named it was told that it was a silent bird! This second name, although inappropriate, will be retained unless someone discovers that an earlier naturalist gave it some other name.

Fortunately, comparatively few changes have been made in the larger classes known as orders and families. To day practically every systematist considers that the game birds which form the subject matter of the present volume fall into three families: the *Anatidae*, which includes the ducks, geese, swans and mergansers, the *Charadriidae*, which holds the woodcock and snipe, and the *Phasianidae*, which contains the pheasant, quail, grouse, partridge, etc.

The famous Professor Huxley thought these last should be separated into two families: the pheasant family or *Phasianidae*, and the grouse family or *Tetraonidae*. More recent researches, however, make it difficult to draw a hard and fast line between the two groups, hence they are all now deemed to belong to one family, the *Phasianidae*. This is distinguished from all other families by the following combination of characters: the bill is short and arched in profile, the corner of the mouth is well behind the line of the forehead, the three front toes are webbed at the base, and the hind toe is much smaller than any of the front ones.

To place the quail and the guinea-fowl in the same family will doubtless appear absurd to many, as the birds differ greatly in size, shape and colouring. Investigation, however, shows that these birds have many habits and anatomical features in common, moreover it is possible to pass, by easy gradations, from the quail to the guinea-fowl. The quail is obviously a miniature partridge, and there are intermediate forms between the two. The tragopan and monals of the Himalayas are connecting links between the partridge and the pheasant. Until recently these birds were classed among the pheasants, but the researches of Mr W. Beebe point to their being

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partridges. There are yet other links between the partridge and the pheasant; the difference between the former and the grouse is not very great; even less is that between the grouse and the blackcock. The pheasant, although it looks unlike the blackcock, inter-breeds with it and the offspring are fertile. Between the pheasants and the peacock are intermediate forms, known as peacock pheasants (*Polyplectrum*). The peacock has been crossed more than once with the guinea-fowl. Thus the quail seems to be a blood relation of the guinea-fowl, albeit a very distant one.

The phasianidae is a very large and heterogeneous family, comprising scores of genera; it is possible to divide it into three distinct groups or sub-families: the pheasant sub-family or *Phasianinae*, the grouse sub-family or *Tetraoninae*, and the partridge sub-family or *Perdicinae*. The pheasant sub-family, to which the pheasant and the domestic fowl belong, is distinguished by the brilliant colours and ornamentations of the males. Nature has lavished on them all the colours of her well-stocked paint-box, and has decorated them with marvellous trains and tails, with crests, wattles and other excrescences.

Some of the members thereof, though exotics, are familiar to every Englishman as captive birds: for example, the peacock and the golden and Amherst pheasants; the ruffs of these last resemble cascades, the one of gold and the other of silver.

The *Perdicinae* differ from the pheasant group in that generally they exhibit none of the brilliant colours which characterise the males of the pheasants, the sexes differ little in appearance, the tail is never long or pointed.

The grouse sub-family is distinguished by the nostrils being covered by feathers, and by the amount of feathering on the legs; this often extends to the toes.

These sub-family characteristics are not absolute. Thus the monal, which some regard as a pheasant and some as a partridge, resembles the pheasants in the brilliant colouring of the male, the partridges in the short square tail, and the grouse in having part of the leg feathered.

This bird affords a good example of the difficulties that have to

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be met by systematists. The truth is that each group merges in the next, so that it is often almost impossible to draw a hard line between the two.

The second of the game bird families, the snipe woodcock family (*Charadriidae*) is a large one. The members of it have no hind toe, or only a very rudimentary one, the mouth does not extend back beyond the forehead. This last peculiarity they share with the ducks. They lay normally a clutch of only four eggs, which are shaped like peg-tops. The family includes lapwings, plovers, oystercatchers, godwits, sandpipers, phalaropes, curlews, woodcock and snipe.

The *Anatidae* are characterised by having the feet webbed, and the mandibles of the straight bill armed with teeth or lamellae (sifting-plates or ridges). The latter characteristic differentiates them from flamingos (which have the bill bent) and petrels, which have sifting-lamellae only in the upper jaw.

Systematists are not agreed as to how this family should be subdivided. It is usually deemed to consist of four sub-families: the ducks, swans, geese and mergansers.

The duck sub-family may be further divided into those which rarely, if ever, dive for food, and those which habitually do so.

CHAPTER II

COLORATION OF GAME BIRDS

THE colouring of plumage presents a number of interesting problems. Some birds are arrayed as if for the purpose of being conspicuous, others as if for concealment. In some the plumage of both sexes is of sombre hue, as in the woodcock; in others it is almost gaudy, as in the sheldrake. In many, one sex only—usually the male—has gay plumage, as in the pheasant; in some of such species the male doffs his showy plumage for a season and assumes what is styled eclipse plumage, as in the case of the mallard drake.

Why do species exhibit these differences in respect of coloration?

Zoologists are unable to answer this question completely, but thanks largely to the work of Charles Darwin some progress has been made towards the solution. Unfortunately he gave the book in which he expounds his theory of evolution a misleading title, namely, *The Origin of Species by means of Natural Selection*. This mistake is in a sense aggravated by the fact that the volume bears a good sub-title of which most people are not aware: "The Preservation of Favoured Races in the Struggle for Life."

Darwin pointed out, first, that no two individuals of a species are exactly alike; in other words, all living things are subject to variation. Secondly, offspring tend to inherit the peculiarities of their parents. Thirdly, despite the fact that each pair of animals produces more—usually many more—than two offspring, the numbers of practically all species remain constant. From this it follows that by far the greater number of individuals do not enjoy their full span of life: they are killed off at various stages. Hence arises a struggle for existence—a fight for life—among them, in which the greater number perish. The individuals that succumb in this struggle are, so Darwin thought, in most cases those having some defect, some feature that

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handicaps them in the struggle for existence, in other words the animals which perish early in life are those which display unfavourable variations

To this struggle for existence, which tends to the weeding out of the unfit and the survival of the fit, Darwin gave the name "natural selection" He pointed out that, even as the breeder, by destroying those of his stock which he considers faulty, and breeding only from those showing good points, has bred the various races of pigeons, poultry, horses, dogs, etc., so in nature is there a constant weeding out of the less favoured individuals which results in the survival of the fittest This is the process designated "natural selection"

• Darwin's theory became generally accepted, and rightly so

It is fitting that Darwin should have a large following of enthusiasts Unfortunately many of these, blinded by the effulgence of this theory, have come to regard natural selection as a creative force

Such have put forward on its behalf claims and pretensions which Darwin never made for it

Professor Ray Lankester has repeatedly proclaimed the all-sufficiency of natural selection to account for all the phenomena of organic evolution Professor Julian Huxley writes (*Evening Standard* October 12th, 1927) "In the past of geology the slow, wasteful and blind forces of natural selection have created the marvellous living mechanism of ant, bee, bird, horse and man out of mere living slime"

• This is nonsense With as much truth might a man, who has just drowned three of a litter of four kittens, hold up the fourth and cry "See! I have created this!"

• Natural selection creates nothing It does not even cause the variations or mutations on which evolution is based These are congenital Thanks to the researches of Weismann, we now understand why no two individuals resemble one another exactly, and why some members of a family take after one parent more than the other, but we have not yet discovered the cause of the new and strange variations and mutations which now and again appear in individuals Until we discover this we must confess that we have no idea of the real causes of the origin of new species

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This does not mean that the theory of natural selection is untenable. Far from it. There can be no doubt that natural selection is a most important factor in evolution. But for it the fauna of the earth would be very unlike what it is. Natural selection tends to maintain, even to improve, the standard of species by eliminating unfit individuals. In the main it is an inhibitive force. The species which now exist may be said to have come into existence in spite of natural selection. As we shall see, sports often arise among game birds, as among most other creatures. Many of these, however, have not succeeded in establishing themselves as separate races. In some cases they have been swamped by repeated crossings with the normal individuals; in others, where they exhibited characters calculated to handicap them in the struggle for existence, they have been weeded out by natural selection. We cannot say what would have happened had natural selection not been operating for countless generations, but it is probable that the world would have displayed a far greater variety of birds and beasts than it now holds. Owing to natural selection the unfit varieties have been killed off; the creatures that now exist are the strong, the fit, a favoured remnant of a great multitude.

Birds of prey are most important selective agents. Many of them subsist mainly on other birds. Their victims have to be discovered and caught before they are eaten. The pursuit of quarry is not an easy task. The intended quarry often escapes. The victims secured are likely to be the most conspicuously attired, the least swift on the wing, and the least adept at taking cover. Individuals which have these defects are the most liable to fall victims to birds of prey; hence the raptorial birds tend indirectly to cause the species on which they prey to become inconspicuously arrayed, swift on the wing, and adepts at taking cover.

The greater the number of raptorial birds and the more relentless they are in the pursuit of quarry, the more severe will be their selection.

Most game birds nest on the ground, and the females alone incubate the eggs. A bird sitting in a nest on the ground is exposed to greater danger than one not chained to the nest by the parental instinct. In consequence, in the case of species that make nests on

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the ground, natural selection must operate on the females more severely than on the males. If, then, natural selection has any effect on the colouring of birds, we should expect the hens that sit in open nests to be more inconspicuously attired than the cocks. In many cases such expectation is realised, the cock pheasant, for example, is a conspicuous bird in comparison with the hen.

We can thus understand why females which sit in exposed nests have inconspicuous plumage, but why are cocks not also inconspicuous? It is true that, as they do not incubate, they are less exposed to danger, but nevertheless they are often exposed. Why, then are they conspicuously attired?

Two attempts to explain this phenomenon have been made.

Darwin was of opinion that the gay liveries of many male birds are the result of what he termed sexual selection—the choosing by the hens of brightly-plumaged mates. He pointed out that generally the males of polygamous species are more brightly coloured than the females, and, as each of the former wants more than one wife, there must be competition among males for females, the latter are therefore in a position to pick and choose their spouses, and they select the more gay ones. This theory has not been generally accepted. Want of space prevents my setting forth the reasons for which it is rejected. It must suffice that in many monogamous species—the mallard, for example—the males are the more brightly coloured, that, although the males display to the hens at the mating season, there is little or no evidence to show that the latter pay the least attention to this display, or that they select as mates the most bravely attired of their suitors, or, indeed, that they select at all in a state of nature. Moreover, dull-hued hens display as well as the males, males display to other males and also to inanimate objects, and this display often takes place when the bird is angry or alarmed.

The other theory is that, as males unable to secure mates harass the females and interfere with incubation, too many cocks spoil the species, hence heavy mortality among them tends to the welfare of the race. Bright plumage, by rendering males conspicuous to birds of prey, leads to heavy mortality among them, hence nature allows them gay liveries.

The advantage of keeping down the numbers of males in polygamous species is obvious. In the case of monogamous species, as we shall notice in the chapter on grouse, old males and barren females are found by experience injurious to the stock.

Neither of these theories pretends to explain the origin of gay liveries. They purport to account for their continuance after they have appeared. As to their origin, all we can say at present is that many species of birds have a tendency to develop bright colouring and ornamental plumes. This tendency seems to be most pronounced in the males. The reason for this is probably that birds preparatory to breeding lay up a store of energy. The energy of the females is used up in the production of eggs and in the making of tissue on which they draw while on short commons during incubation. Such demands are not made on the males, hence the surplus energy stored up in them is dissipated in song, dance, bright feathers and ornamental plumes. These do not show themselves in the first plumage of male birds, because growing makes great demands on their energy.

This view seems to explain the gradual pigmentation of the plumage of the males before the breeding season, also the tendency of barren females to assume the gay plumage of the male.

It seems that the direct cause of the female not assuming the bright colouring of the male is the secretion by her generative organs of what are known as hormones or hormones. When her generative organs decay or become diseased, these hormones are not secreted, or are produced in diminished numbers; in consequence the tendency for her to assume showy plumage is no longer fully checked.

If it be important for the welfare of a species that the hens have inconspicuous plumage, natural selection will tend to weed out the individuals whose plumage shows bright colouring, and those who produce the greatest number of colour-inhibiting hormones will tend to survive and transmit this feature to their offspring.

It may here be remarked that the secretion of such hormones is not necessarily linked with fertility. Fertile hens occasionally assume male plumage to some extent. This is known to occur

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among pheasants and poultry Mr G H Porter writes (*Daily Mail*, September 14th, 1927) "I possess two hens, a Leghorn, nine years, and a Leghorn-Wyandotte cross, eight years old Both lay regularly, both crow, and have the characteristics of the cockerel " In species, such as the sheldrake, where the female is very showy like the male, the nest is in a burrow in the ground, or otherwise concealed, or so constructed that the sitting hen is not exposed to view In such cases there is not the same necessity for the female to secrete hormones which check her tendency to assume the gay livery of the male

The above facts indicate that the answer to the question asked at the beginning of this chapter should be as follows

Birds and beasts are protean and very plastic No two individuals are exactly alike Although offspring tend to resemble their parents more or less closely, strange characteristics are wont to appear suddenly, we know not how There is clearly a power, a force, an urge—call it what you will—which is causing every species to vary in certain directions and along certain lines

Some birds tend to assume bright plumage, others dull or mottled feathering Some, as for example, pheasants, tend to grow long tails, others, herons, for example, to acquire ornamental plumes at the breeding season

Pheasants, partridges, grouse, snipe and woodcock tend to throw off dark, pale, albinistic and erythristic sports If the growth force causing such variations were permitted to work without hindrance there would exist a far greater variety of birds than we now see Strange and wonderful as many of them are, they are commonplace in comparison with what might have come into being If no restraint were placed on the growth force there would probably be a white species of woodcock, a black one and a red one Similar variety would show itself in other game birds We might also expect to see eagles as big as ostriches and pheasants with tails twenty feet long On the other hand, there would probably be a greater number of flightless birds, and the general efficiency of organisms would be lower To the limiting force the name of natural selection has been given This cuts off all individuals that are developed in any

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direction to an extent sufficient to handicap them greatly in the struggle for existence. The form and coloration of every living creature in a state of nature may be said to be the result of two forces: the growth force and natural selection.

In the case of dogs, pigeons, fowls, ducks, horses and other domestic animals, a third force—the selection of the human breeder—largely replaces natural selection. This seizes on peculiar variations irrespective of their utility to the organism, hence the great variety of form and colour displayed by such creatures.

CHAPTER III

THE MOULT OF GAME BIRDS

PLUMAGE is to a bird what fur is to a mammal—a cloak to keep it warm and protect its body. Feathers resemble hairs in several respects; both are excrescences from the under-skin; both, not being supplied with sensory nerves, are devoid of sensation. A hair differs from a feather in that it grows slowly.

It is usually said that a feather becomes dead when fully grown, and then cannot change colour except by the pigment fading. That this is not the case I shall try to prove.

Every species of bird seems to change the greater part, if not the whole, of its feathering at least once a year. Among birds that live in the northern hemisphere, a moult usually occurs in the late summer or early autumn, with the result that the worn feathers are replaced by new warm ones at the time when their possessors need them most.

Moulting is a subject regarding which we have surprisingly little information. Few ornithologists pay much attention to it. Those who work in the field have but little opportunity of studying the phenomenon, nor are museum naturalists in a much better position. Aviculturists and bird-fanciers, who have facilities for acquiring practical knowledge of the subject, seem to have given it but little consideration; probably for the reason that prevented me doing so when I had the opportunity, namely the dogmatic statements regarding moulting which appear in ornithological text-books. When scientific men write as though they knew all about a subject, and make pronouncements which sound like the last word on it, the practical man is not likely to spend time investigating it.

Thirty years ago I was taught that a full-grown feather cannot change colour by the accession of pigment, and that the only way it can lose colour is by fading, as a dyed fabric does.

This seems still to be the prevailing opinion, or was until very recently. Thus Mr. William Beebe, the Curator of the New York Zoological Park and a well-known authority on matters ornithological, wrote in 1906 (*The Bird*, p. 52): "We have seen how birds, by moulting their feathers, change the colour of their plumage; in some cases several times each year. There is, however, still another way in which the appearance of new colour is brought about. Not by increase of pigment, for the feather when once full grown is dead; but by the breaking or fraying of the edges of each feather."

Mr. W. P. Pycraft, an English authority, is more guarded in his language. He wrote in 1910 (*A History of Birds*, p. 284): "While there can be no question but that the vast majority of birds which assume a nuptial dress do so through the agency of moulting, it is stoutly maintained by many that a considerable number of species assume the nuptial livery not by moulting but by the infusion of pigment into feathers till then uncoloured."

In the winter of 1922, Mr. R. G. Wright, who was then painting at Lahore the pictures to illustrate our volume on the ducks of India, pointed out to me that the feathers of the widgeon who was sitting as his model were gradually becoming more richly pigmented. I then noticed that the red-crested pochards in the Zoological Gardens at Lahore gained colour gradually during the winter, apparently without moulting. In consequence, in the above-mentioned work, I wrote of the plumage of drakes: "The assumption of bright colouring, unlike that of the dull, is very gradual; the gay feathers are often of sober hue when they first appear, and grow more vivid or even change colour as they develop."

The writing of the present volume caused me again to turn my attention to ducks, particularly the mallard, which I had excellent opportunities of observing on the Thames.

It seemed strange that, while the female moults but once in the year, the male should shed his feathers twice in rapid succession.

As the almost simultaneous shedding of the quills renders the bird incapable of flight for a time, the advantage of the drake going into eclipse plumage and thereby becoming comparatively inconspicuous is apparent; but if feathers can become pigmented after

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they are fully grown, and if this happens in the widgeon, why should it not take place in all brightly plumaged drakes, and why should drakes undergo a second moult a few weeks after the first?

I therefore set myself to ascertain whether or not the feathers of the mallard drake change colour as do those of the widgeon. Observation soon convinced me that the feathers on the flanks and shoulders, which are mottled brown when they first appear, later become white with dark pencillings.

I then put the question to myself. Does a second moult really take place, or is it a myth which originated at a time when ornithologists believed that feathers cannot change colour?

I noticed certain features in the plumage of the drakes on the Thames which led me to doubt whether a second moult occurs.

Knowing that Mr J G Millais had paid careful attention to the plumage of game birds, I consulted his beautiful books to ascertain what he had to say on the subject. In his *Natural History of the Surface Feeding Ducks*, I found ample proof that the feathers of mallard and other drakes change colour both by pigmentation and depigmentation. Mr Millais, however, is of opinion that the drake mallard does undergo a second moult. As I am not convinced of the correctness of this conclusion, and as to him belongs the credit of proving that the feathers of the mallard and other drakes change colour in both the ways enumerated above, I take the liberty of quoting him at some length.

He divides the changes of plumage of the drake mallard into three stages. *First Stage*—About May 20th in England and July 1st in Scotland the cheek feathers begin to change colour, the basal part becoming a pale straw hue, the tip only remaining green. Later the feathers of the white collar gradually turn brown. All this time new feathers are forming below the old ones.

Second Stage—By approximately June 30th in England and July 10th in Scotland a general moult has set in. Feathers over the whole body drop and are renewed. Cheek feathers, which have already changed colour to autumn tints, now fall out, as do the longer bronze feathers on the top and back of the head, which hitherto have undergone little or no change. *Many of the new feathers are exactly*

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the same colour as those of the spring plumage which has just been moulted. This is particularly noticeable amongst the feathers of the breast and rump. At the beginning of this stage the tail is generally half moulted, the central feathers new, and the outer old and about to drop, but almost changed in colour like the new ones.

"About a week or ten days after June 30th we may say that the drake has to all intents and purposes completely changed to his autumn dress, for his brown dress is all new except his wings which now begin to moult. When at last the quill feathers begin to fall they do so with extreme rapidity. I have known them all come out together in one day, the new flush starting at once. Sometimes they are cast before the drake has completely assumed his brown dress, but that rarely happens. . . . At the beginning of stage two, when the new feathers have come to the surface, we see a wonderful power of control on the part of the bird itself over all the old feathers which are still interspersed among the plumage, a power of blending or sympathetic change to meet the new and more sombre colour scheme. To the very last moment of their attachment to the bird *these old feathers are alive to colour transmission.* Hence, in passing our hand over the plumage of the old drake at the beginning of this stage, that is to say when he is in full actual change, we are at first surprised to find numerous brown and barred feathers apparently of the new eclipse plumage coming away under our touch; but in reality these are old feathers which have changed colour, *often in the last day of their existence.* For these reasons I am convinced that a bird has full power to control the moult as it will, and also infuse or withhold colouring matter as it thinks necessary. Except as to the wings (which grow slowly and pass through the ordinary single moult of all other birds) the whole plumage now remains dormant and so we pass to stage three, when the movement to the winter dress commences." The tail feathers are moulted about July 6th in England.

Third Stage.—Millais states that this begins about August 12th in Scotland. He does not give the date for England. He writes: "Save that the wings are now complete, there has been up to this date no actual change in the bird since July 6th, but now a big move

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in the plumage is about to take place, the eclipse is to be exchanged for the plumage of winter. The method of transformation is indeed most remarkable. Take the vent for instance. The new feathers, instead of coming in black as we should expect in a clean moult, arrive in all colours from sandy brown, with dark grey or black spots to pure white. It certainly does seem strange that the birds should bring in a new set of feathers of a colour which we know will in a fortnight at latest change to its exact opposite.

Another change now commences: all the new feathers on the upper chest begin to change colour, displaying the first tints of that beautiful chestnut brown which is afterwards one of the chief glories of the drake's winter dress. The change takes place at first very slowly, but in September its progress is more rapid, synchronising with the change of the spotted feathers all down the breast, which gradually lose their spots and change to the grey ones of the full winter dress. The feathers on the back change from their autumn to their winter dress, and this more suddenly than those on the breast, and it is not at all uncommon about the end of August or beginning of September to see the full winter feathers coming in, in full colour without any pretence at compromise. Pure grey feathers begin to appear amongst the brown ones. And so the change goes on by regular steps from August 12th to September 30th when the whole process is completed. Thus we learn the important fact that, whilst much of the plumage (notably the wings, tail, long scapulars, parts of the vent and breast) has for the most part undergone only one actual change of feather in the great change from the full spring plumage (still retained on June 15th) to the new pure coloured plumage of October 1st, yet the head, neck, back and upper breast have between July 1st and October 1st undergone two actual moults, the casting of the feathers taking place respectively about July 1st and September 25th."

Millais further states that the tail feathers do not begin to curl until about September 20th, and that the white neck ring, when it first appears, is broad and grows narrower during the winter.

There can be no doubt that many of the feathers of the mallard drake change colour during the moult. Millais's book contains some

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beautiful coloured plates exhibiting colour changes in individual feathers. My observations on the mallard drakes on the Thames from August 27th, 1927 onwards, have convinced me that most of the vermiculated feathers on the back and flanks change colour.

Between August 27th and the middle of September, I saw fully thirty birds having such feathers which were partly brown and partly white with more or less dark pencillings. The brown colouring begins to be absorbed at the base and the tip of the feather, so that a time comes when this is white with a brown crescent, the white part usually being vermiculated. The flank feathers of one individual were very pale brown with fine dark vermiculations and a brown crescent, showing that in his case the vermiculations appeared before the brown was completely absorbed.

While acknowledging the great value of Mr. Millais's observations on the colour changes of the mallard and other drakes, I am constrained to say that I am unable to accept several of his statements, notably that a duck can control its moult at will and infuse or withhold colouring matter as it thinks necessary. I am convinced that a duck has no more control over the shedding and colouring of its feathers than a man has over the falling out and blanching of his hair.

Millais states that the feathers of the tail and wings of the mallard drake in England are shed in July. If this be so the new quills should invariably be fully developed by September 1st, but I saw on that day in 1927 several drakes unable to fly, although some had partially assumed their winter plumage. Most drakes are able to fly by that date; these probably shed their quills in July.

Millais asserts that the curling of the tail feathers does not show itself before September 20th. This may be the case generally, but it is not always so. On August 29th I noticed several drakes having the tail feathers fully curled; some of these birds were very backward in other respects. One, indeed, but for these curled feathers had much the appearance of a female. On September 1st and 3rd, I saw two drakes in which the bright plumage was almost fully developed. These birds, if they moulted twice, must have completed the process in eleven weeks unless they went into eclipse exceptionally.

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My observations of mallard in 1927 show that these birds neither moult nor change their colouring uniformly some moult and colour earlier than others, while the order in which the new tints appear varies with the individual. It has already been remarked that, whereas most of the mallards on the Thames were strong on the wing by September 1st, some could not fly at all.

On September 2nd I saw, side by side, a drake almost in full plumage and one who, but for his curled tail feathers, might almost have passed for a female.

Scarcely any two individuals seem to colour in the same order. On one day I noticed, among others, the following

- A drake displaying the curled tail feathers, and having about half the head feathering green and half the flank feathers vermiculated, but no trace of a white neck ring,

A drake, of which the neck ring was well formed, lacking the curled tail feathers,

A drake, unable to fly, who displayed much chestnut on the breast and traces of the neck ring

The lack of uniformity in coming into colour is not confined to the mallard. On November 26th, 1927, I noticed among the water-fowl in St. James's Park two widgeon drakes, one of whom had come almost completely into full dress while the latter had not.

Mr. Frank Finn informs me that, of two pintail drakes which he observed for several seasons in the Zoological Gardens at Calcutta, one was always more advanced than the other in respect of changes in the colouring of the plumage, in consequence there was, every year, a short period during which one bird was in full dress and the other in eclipse.

Some of the above facts do not seem to fit in with the theory that the drake undergoes a double moult.

May it not be that some of the drakes examined by Millais were later than others in moulting the feathers of the head, neck, etc., or that the moult of those parts extends over a long period, and, in consequence, he was led to believe that the feathers on the parts in question are shed twice? In the case of the peacock the feathers of the train begin to sprout soon after the moult, then they remain

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quiescent for a considerable time. If they were covered by other feathers, a casual observer might suppose them to be the result of a second moult.

It may be that the curled tail feathers of the mallard drake remain short and straight for some time and then begin to curl.

Naturalists who assert that a bird undergoes two or three moults in the year do not set forth the evidence on which such statements are based.

I know of only one method of discovering what feathers are moulted in any given period, namely that of keeping a bird in solitary confinement, collecting daily every feather moulted, placing each day's collection in a separate envelope, and, at the end of the moult, counting the feathers so collected. I can find no evidence that anyone has carried out such an experiment. The experiment has the appearance of being laborious but simple. As a matter of fact it is not so simple as it seems, because caged ducks sometimes do not moult in an ordinary manner. Finn informs me that some Japanese teal (*Nettion formosum*) and a female mandarin duck kept in cages by dealers moulted their quills gradually in pairs, instead of almost simultaneously as they do in natural conditions.

Yarrell records that a caged pintail drake did not go into undress; either close confinement inhibited the moult or the new feathers appeared fully coloured. He does not say which happened. Mr. J. C. Phillips, however, writes (*A Natural History of the Ducks*, vol. I., p. 10): "I once kept a male mallard in a cold room all summer, and in this way delayed the moult. When he was brought into normal surroundings in September, he immediately moulted, but went directly into full dress, omitting his eclipse." These interesting experiments fit in well with the theory that drakes undergo but one moult in the year.

There seems no reason why the suggested experiment should not be carried out successfully, if the drake be provided with a large basin of water and confined in a roomy cage having no floor, and the cage frequently moved.

It may transpire that some supposed double moults are really one moult performed very gradually.

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A few game birds, other than ducks, go into a kind of eclipse plumage after the breeding season. The blackcock and the grouse may be cited as examples, although in their case, especially that of the grouse, the difference in appearance is but slight.

According to Millais the cock red grouse, early in March, becomes more red by the addition of pigment to the feathers, and, at the end of the month, new rich black and golden feathers appear on the head only. Then the feathers of the legs and feet are shed. In the latter half of June the cock moults all his feathers except the ones acquired in March and April, and emerges in a sober dress which Millais compares to the eclipse plumage of a drake. He asserts that there is a second moult in September, like that in the mallard. Is this so?

At the risk of wearying the reader I must say a few words on the very interesting subject of the moult of the ptarmigan. Most books tell us that this bird undergoes no fewer than three moults in the course of the year. Ptarmigan, writes Mr W Beebe (*The Bird*, p 48), "moult after the breeding season into a special grey or dark plumage, harmonising well with the autumnal shades of the grass and lichened rocks. In the late fall a second plumage of immaculate white is assumed affording these birds great protection on the snowy wastes where they live. In the spring a third suit is donned—brown and parti coloured like the environment which late in the year is still covered with patches of snow here and there. This, too, is the nuptial plumage and lasts until the grey garb completes the cycle of the year's changes. The wing feathers are white all the year, but when the wings are closed they telescope so neatly beneath the feathers of the shoulders that they are not noticeable."

Millais, however, will have none of the autumn moult. He thus reduces the moults to two. He says (*Natural History of British Game Birds*, p 64) that the summer plumage begins to appear gradually in February. In March the birds shed all their feathers except those of the tail and part of the breast and the larger wing feathers. In July the whole plumage becomes gradually darker owing to tip covering. From August to October there is a full moult into first the autumn and then the winter plumage. "These new feathers are

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not again renewed, as some naturalists would have us believe, but change the grey colour into white, either suddenly or gradually according to weather conditions."

I find it difficult to believe that the female has her energies sapped by moulting many of her feathers in March, just before she lays, that is to say, at the time when she stands in need of every grain of energy she possesses to enable her to undertake the arduous duties of breeding. May it not be that in March, some extra feathers appear in the plumage of the ptarmigan, as they do in the case of its relative, the red grouse?

I have had no opportunity of studying the moult of the ptarmigan: thus my remarks are based on the observations of others and on general principles.

Mrs. Haig Thomas writes (*Avicultural Magazine*, October 1907, p. 373): "Having for many years been puzzled at the rapid change which takes place in the Fjeld Ryper (Ptarmigan) in late autumn, from brown to pure white, I wrote last October to a Norwegian, a man I have known for many years, whose life is mostly spent in the woods, asking him to procure me some ryper in the condition of the winter change from brown to white feathers. On the 1st of December the man wrote as follows: 'I did procure six birds for you, but the brown feathers were so loose that they all fell off themselves, so I sold the birds as I thought it useless to send them.' This is clear proof of an autumn moult."

Mr. R. Blakey gives (*Shooting*, p. 61), without stating the reference, the following quotation regarding the ptarmigan: "Recent experiments have proved beyond doubt, that the change is that of colour, not of feather; at least the plumage does not undergo a general moult for the purpose. The moult of those birds which, like the ptarmigan, change their livery, appears to be gradual, in order that the system may not be taxed too much, seeing that it has already to struggle with the debilitating effects of cold. Besides all this, it is scarcely reasonable to suppose that the young ptarmigans should have the brown plumage of their parents to moult when they have only just assumed it. The rationale then appears to be thus: as the winter approaches the summer dress loses its colour

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and gradually passes into the white, while at the same time an addition of new white feathers increases the fulness of the plumage to keep up vital heat

"On the approach of spring the older feathers of the past year are thrown off, their place being supplied by the coloured ones, while the white ones, that sprang up as the winter sets in, gradually gain the hue which was then denied them. Hence in spring, ptarmigans are seen in a livery irregularly parti coloured, these having acquired their tints will be moulted in autumn, so that no individual feather undergoes more than one mutation. It will thus be seen that the moult is never simultaneously performed, but that a partial loss and accession of feathers, except in the depth of winter, is almost constantly taking place."

Lord Walsingham writes of the ptarmigan (*The Badminton Library, Shooting*, p. 39) "It is well known that the complete change of colour from blue grey to pure white is not effected by any process of moulting. The dark pigment disappears first from the tips of the feathers, and often remains about their bases long after it has ceased to be visible when the plumage is undisturbed. In the summer again, it retains its full measure of protection through the deposition of pigment, probably by some process analagous to the oxidation of cellular protoplasm in plants under the influence of warmth."

My enquiries into the nature of the change of colour in game birds led me to seek out recorded observations on the subject, with rather surprising results.

Nearly a century ago Yarrell recorded (*Proceedings of the Zoological Society*, Part I, p. 56) that in the black tailed godwit, golden plover, and immature herring gull, some of the feathers change colour by pigmentation. In the case of the gull this was proved by marking particular feathers.

In 1852 Schlegel published a paper in which he asserted that some birds assume breeding dress without moulting. Most ornithologists refused to believe this, but Gatke, Martin, and Glozer agreed with Schlegel. Gatke then began to study the subject carefully, and in 1895 set out the results of forty years' observation in his *Heligoland as an Ornithological Observatory*. These not only show that

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many feathers change colour by the acquisition or withdrawal of pigment, but demonstrate the truth of another of Schlegel's assertions, namely, that the margins of the feathers of many birds of the snipe family which become indented or serrated through wear, are restored to their former perfect condition.

Gätke discovered that there are four ways in which the colour of plumage may change: by moult, by the shedding of the edges of the feathers, by the peeling off of an envelope, and by the infusion or loss of pigment.

He found that in the same individual some feathers may change their colour by one mode and others by another. Thus he states that the black markings on the head and neck of the grey plover are obtained by an alteration of colour, while the black on the breast is the result of a moult.

The shedding of the edges of the feathers is the cause of the colour changes that occur in chats, redstarts, shore larks, finches and buntings.

Gätke says that the bright colouring of the linnet and the blue-throat and the black of the pied-wagtail and pied-flycatcher are the result of the peeling off of an inconspicuously coloured envelope.

His observations satisfied him that in the following birds the colour changes seen in some parts of the plumage are due to "an actual, complete and very striking change in the colour of the feathers, without any such alteration being brought about or even assisted by any changes in their texture": pied and white-wagtails, several gulls, plovers, godwits, and auks, the dunlin, guillemot, sanderling and knot.

"There can," he writes (*loc. cit.*, p. 163), "be no doubt that an alteration of colour and renovation of worn parts of the feathers takes place to a greater or less extent in the great majority of birds."

Among other discoveries made by Gätke is the fact that in the same bird the infusion of colour into the feathers does not follow the same course in all the parts so affected. Thus in the case of the little gull the black in the feathers of the sides of the head and the neck begins to appear below what afterwards marks the line of separation between the black and white markings, the colour first

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shows itself in scarcely perceptible dots of pure black at the extreme tips of the separate barbs of each feather, the lower portion of the edge being the first to be affected, thus each feather acquires a narrow border composed of extremely fine black specks, by degrees these edges increase in breadth until the black colour, extending towards the roots of the feathers, finally comes to be spread over the whole surface. In the case of the change to black of the blue-grey feathers of the crown, the white shafts are the first to acquire black pigment, which afterwards spreads itself outwards over the webs of the feathers.

Gatke, it will be noticed, observed chiefly gulls and wading birds. His observations have been confirmed as regards the laughing gull by Bonhôte, and the herring gull by Gadow.

The observations of Millais, Wright and myself regarding ducks receive confirmation by those of Mr Frank Finn who noticed that a female eider duck, whom he watched through more than one moult, in the Zoological Gardens, London, had, immediately after the moult, a wing bar of black bordered with white, as well marked as that of the mallard. This gradually disappeared.

The same observer has noticed that the female spotted bill duck in captivity sometimes loses the white wing streak after the moult, by its becoming marked with brown.

Pigmentation and depigmentation of feathers are not confined to gulls, waders, ducks and game birds.

Observation has convinced me that some of the feathers of the avadavat and whydahs, without being moulted, change colour by the addition of pigment. Dr A G Butler has demonstrated (*Agricultural Magazine*, 1907) that this happens in the case of some weavers and buntings. We have noticed that Gatke found it to occur in wagtails.

The subject of the pigmentation of feathers, like that of the moult, offers a most promising field for observation.

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species are crossed for the first time. Occasionally most surprising results follow. Thus, the bull American bison produces, with the domestic cow, hybrids, known as "cataloes," which are fertile, but the reverse cross of the domestic bull with the bison cow does not yield any offspring.

Another curious fact is that the characteristics of a hybrid may vary according to the sexes of the parents; thus the hinny, which is the produce of the crossing of a horse and she-ass, is a very different animal from the mule, bred from the jackass and the mare. So inferior is the former from the point of view of man that it is rarely bred.

Speaking generally, the closer the relationship between two species the greater is the probability of individuals belonging to them being willing to interbreed, and the greater the likelihood of the resulting offspring proving fertile.

To this, however, there are many exceptions. Sometimes individuals of the same species will not mate with one another. Some species are far more prone than others to breed with alien species.

The following notes on the best known of the British game-bird hybrids may be of interest.

PHEASANT HYBRIDS

All species and sub-species of the genus *Phasianus* breed freely *inter se*, and the progeny are invariably fertile among themselves or with either of the parent forms.

Hybrids are known to have resulted from the crossing of the common pheasant and the cheer, Reeve's, Amherst's, the gold and the silver pheasant, the black-backed kalij, the fowl, guinea-fowl, turkey, capercaillie and black grouse.

Reeve's-Common Pheasant hybrid. The cock is mostly glossy maroon in colour. He has white eyebrows, cheeks and collar. The tail, which is longer and bigger than that of the common pheasant, is buff with dark cross-bars. This hybrid is sometimes fertile, but not so certainly so as those between the various species of *Phasianus*.

Gold-Common Pheasant hybrid. This is bright orange-chestnut, having a metallic purple gloss on the neck. The cap and tail are

buff, the latter being cross-barred. There is a red expansible wattle under the eye.

As the gold pheasant is the most popular of the fancy pheasants and is liable to escape, hybrids between it and the common species are likely to appear at any time.

Amherst-Common Pheasant hybrid Strange to relate, this is very like the gold-common pheasant hybrid, but has more of the metallic purple gloss on the neck and is larger.

Silver-Common Pheasant hybrid The head and neck of this are glossy green. The remainder of the upper plumage is white, finely pencilled with black, the tail having cross bars of this hue. The under parts are mottled bay and black.

Fowl-Common Pheasant hybrid As Mr. Daglish's drawing shows, this has neither comb nor wattle, and resembles the pheasant rather than the fowl. It exhibits, however, not pheasant colouring, but varied hues like those of mongrel poultry. One of these hybrids, in the collection at the South Kensington Museum, between a pheasant and a game bantam (doubtless of the jungle fowl colouring), has the usual black neck of such crosses, and the body dun above and bay below.

This is the best known of the pheasant hybrids, because the cock pheasant often visits the poultry yard. There are, however, no records of hybrids between pheasants and red jungle-fowl, although the latter has been turned out into pheasant coverts. Doubtless the cock pheasant, although able to vanquish the barndoor cock, is no match for the more active and courageous jungle cock, and the latter has no inclination to take unto himself an alien mate.

A medieval German writer, Gybertus Longolius, gives, in a Latin dialogue, instructions for crossing captive cock pheasants with fowls, to produce birds to be sold as pheasants. "But surely," cries his interlocutor, "such birds are different from real pheasants?" "They are," replies Gybertus, "but those not in the know don't see through the swindle!"

Evidently pheasants were not easily procured in those days on the Continent, where vermin are more numerous and varied than in England, and the climate is more severe in winter. Old writers

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sometimes call this fowl-pheasant hybrid the Pero, but the name seems no longer used.

Blackgame-Common Pheasant hybrid. A coloured plate of this is given in Mr. J. G. Millais's *Game Birds and Shooting Sketches*. It has neither spurs nor ear tufts, and the legs are not feathered, nor are the toes pectinated. The tail is short and wedge-shaped. Round the eye is a narrow ring of red skin. The plumage is dull bronze-brown, darkest on the breast, and palest at the base of the tail, which is yellowish-buff.

Capercaillie-Common Pheasant hybrid. This is remarkably like the blackgame-pheasant hybrid in build and colouring, but is of paler hue on the back. It is also figured by Mr. Millais. In both these hybrids the feet are remarkably large, indicating that the ancestors of these game birds had large feet.

Turkey-Common Pheasant hybrid. A wild bird which was believed to be this hybrid was killed in England more than a hundred years ago. A picture of it is given in Edwards's book on birds. A photograph of this picture, taken by Mr. F. Bond, is reproduced in Mr. Finn's *Birds of Our Country*, vol. 2.

PARTRIDGE HYBRIDS

So far as I am aware there is no case of an undoubted hybrid between either of the British partridges and any other species.

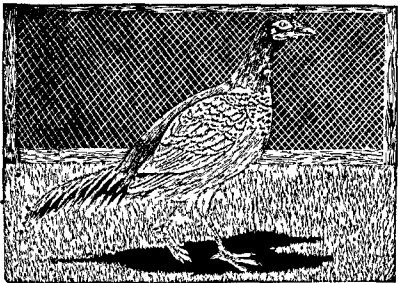
Birds have been seen which seem to have some characteristics of the grey and some of the red-legged species. At least two individuals have been obtained of which the legs and flanks resembled those of the red-leg and the rest of the plumage that of the grey; it is possible that these were hybrids between the two species.

There is a record of a supposed red grouse-partridge hybrid shot near Harrogate in 1866. Howard Saunders, describing this (Yarrell's *British Birds*, 4th edition, vol. 3, p. 114), speaks of "the bill being grouse-like, the tarsi and feet partially feathered, the breast and body mottled with pale reddish brown with a sprinkling of grey, the quill feathers dirty white, with lavender grey outer webs." He considers the feathering of the legs and feet to be tolerably conclusive. Personally, I should not deem this feature to be

Fowl and Pheasant Hybrid

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decisive, usually when one only of the parents has a comb, spurs, ear-tufts or feathered legs, the offspring does not show this, thus the cross resulting from pairing the pheasant with the blackgame or capercaillie has bare legs. Moreover, the alleged hybrid showed signs of albinism in the wings, and so was abnormal. However, Finn states that he has seen a hybrid between the Indian and Burmese peafowl which had the first six flight feathers white, showing that albinism may appear in hybrids.

Mr J G Millais, it should be noted, states that two red grouse-partridge hybrids have been obtained in Scotland, but he was not able to describe the birds.

RED GROUSE HYBRIDS

Mention has just been made of a supposed red grouse-partridge hybrid. The ptarmigan and grouse do not appear to interbreed. The reason of this may be that the ptarmigan nests at higher altitudes than the grouse, in consequence the two species do not meet at the mating season. As a matter of fact it often happens that closely allied species do not interbreed in natural conditions, it would seem that there is antipathy between them.

Occasionally a bird is shot which sportsmen believe to be a red grouse-ptarmigan hybrid, it is probably a pied red grouse. In *British Birds* (vol 1), however, there are illustrations of two birds which Mr W R Ogilvie Grant considers are really hybrids between the red grouse and the ptarmigan. But as the two specimens differ markedly in appearance, they may well be but varieties of the grouse. It is worthy of note that the bird shot on September 9th has more white in the plumage than that obtained in November.

Mr J G Millais has depicted (*Game Birds and Shooting Sketches*) a bird said to be the result of the union of a bantam cock and a hen red grouse. There are records of two such hybrids, both produced in South Ireland. The bird figured by Millais has a white nape, a feature not found in either of the alleged parents. The other specimen is all white, this is attributed to the bantam father being of that hue. The plumage of Millais's bird has much the appearance

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of the blackgame-grouse hybrid, but its plumage is lighter, its legs are longer, and its tail is not forked.

Blackgame-Grouse hybrid. This is comparatively common; as long ago as 1836 Macgillivray described it. The male is considerably bigger than a grouse but not so large as a blackcock. He is not much darker than the "black" variety of the grouse, except on the breast, which really is black. The throat, abdomen and wings are barred with white in some specimens. The tail is slightly forked but has sixteen feathers like that of the grouse. The legs are feathered, and this feathering extends nearly half way along the toes. One of these hybrids is figured in the *Field* (December 29th, 1927). The female has not been described, but presumably is no darker than a hen grouse, and the tail may well show hardly any fork. An unusually large grouse with a square tail and toes coming through the stockings may well be a female of this hybrid. Any sportsman who shoots what appears to be a hybrid would be rendering a service to science if he sent the bird to the South Kensington Museum.

CAPERCAILLIE HYBRIDS

The Rackelhane or Blackgame-Capercaillie hybrid. This is perhaps the most interesting of all game-bird hybrids. It is the only wild-bred cross between truly distinct species which is at all common.

The male is bigger than the female capercaillie, but not so large as the male. The tail is slightly forked, like that of the sand-martin or canary. The plumage, although darker than that of the capercaillie, is neither so black nor so glossy as that of the blackcock; the breast is glossy purple where the capercaillie's is green; the blue gloss of the blackcock is absent.

The female may be recognised by her square tail, this being intermediate between the rounded tail of the hen capercaillie and the forked one of the grey hen.

The cock utters a peculiar retching sound, from which he obtains the name Rackelhane, "rackla" being the Swedish term for retching.

The following verse from my friend Mr. Frank Finn's *Masque of*

GAME-BIRD HYBRIDS

Birds and Other Poems, sums up admirably most of what is known regarding this hybrid

“Loneliest of all the birds that fly,
Begotten in illicit flames
Between Sir Blackcock, squire of dames,
And capercaillie of the pines
Though on my breast strange purple shines
And full my form of strength and grace,
I know nor mate nor resting place,
And when my wandering life is done
Kind are the hands that hold the gun ”

In the above Finn gives expression to the general belief that the hybrid is the offspring of the blackcock and hen capercaillie. These have actually been seen to pair in Sweden. The hen capercaillie wanders more than the male, possibly because her diet is more varied, and so is likely to meet the amorous blackcock. On the other hand young capercaillies are said to be kept in subjection by the old males. If this be so (which I doubt) they are likely to pair with grey hens.

In the above verses allusion is made to the loneliness and restlessness of the rakkelhane. It has no playgrounds of its own, and attends the “leks” of the parent species, bullying the blackcocks and disturbing the capercaillies, hence it is shot as “vermin”.

*Finn speaks of its having no mate. Ogilvie Grant states (*Game Birds*) that it is apparently fertile. If so, it does not seem to mate with either of the parent species, for there is no record of any three-quarter bred birds.

Fowl-Capercaillie hybrid Mention is made of this in the chapter on the capercaillie.

MALLARD HYBRIDS

Most species of duck seem willing to mate with almost any other member of the family. The following hybrids between the mallard and other ducks are well-known.

Wigeon Mallard hybrid The drake of this is slightly smaller than

In the course of his experiments in crossing ducks, Bonhote made many interesting discoveries. He found, for example, that in forms which were part mallard, part pintail, and part spotbill, the drakes in full breeding plumage show a mixture of pintail and mallard characteristics; while in the eclipse plumage the markings of the spotbill predominate.

Muscovy-Mallard hybrid. Though generally bred from domestic birds, this cross readily takes wing and goes wild. It has broad goose-like wings and a moderately long tail. It weighs as much as six pounds. It varies in colour, generally being like a mallard in faded plumage, having a green wing-bar.

Eider-Mallard hybrid. This is described and figured in the *Scottish Naturalist* for 1916. The male parent of this specimen was the mallard, whom it resembled in colouring; but it showed fine cross-bars on the breast, a feature possessed by neither parent. It was eider-like in shape, but was never seen to dive.

In conclusion mention must be made of the hybrid between the common and the white-eyed pochard, which was formerly thought to be a true species and named Paget's Pochard. It differs from the common pochard in having the head and breast chestnut, yellow eyes and a white wing-bar; moreover, the pencilled grey of the body is darker above than below.

PART II
BRITISH GAME BIRDS

CHAPTER V

THE PHEASANT

"**A**ND God said, Let us make man . . . and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth."

Man has made extensive use of his prerogative. Wittingly and unwittingly he has wrought great changes in the fauna of the globe. But for him there would be no pheasants in the British Isles.

The pheasant is an Asiatic, but, as it has lived for centuries in our country, we are justified in regarding it as a British bird, despite the fact that the feathered folk are not within the ambit of the Naturalisation Act of 1870. May not we go farther and give the pheasant pride of place among our game birds? Not only does it provide more sport than any other, but, next to its relative the fowl and possibly the duck, it is the most valuable bird on earth.

"Rob these islands," wrote a famous sportsman, "of foxes and pheasants—or, in other words, of hunting and shooting—and the emigration of the rich from our shores during the winter . . . would probably be twenty times greater than it now is."

The pheasant is a hardy fowl; it is at home equally on the bleak, wind-swept plains of Mongolia and Turkestan, in the well-wooded valleys of the Caucasus, on the temperate uplands of Burma, in the flat rice-fields of China, in densely populated Japan and in the swampy tamarisk and grass jungle of the bed of the Bala Morghab, where it affords the best shooting in the world. It also flourishes in all temperate parts of the earth into which it has been introduced by man, whether in Europe, America or Australasia.

We have noticed (Chapter I) that most birds of wide range become split up into local races, which differ from one another slightly in appearance. This is true of the pheasant. Twenty-four well-marked local varieties of this species are known to exist, and

there may be others living in some of the unexplored regions of Asia.

Systematists are not agreed as to whether these local varieties are separate species or merely sub-species. Mr. William Beebe, who has recently made a special study of pheasants, considers that the genus *Phasianus* is composed of but two species—the green pheasant of Japan (*P. versicolor*) and the pheasant of the mainland of Asia (*P. colchicus*); the latter he divides into twenty-three local races or sub-species. Many ornithologists, however, would elevate most of these to the dignity of species. The truth of the matter is that living organisms are so plastic, so protean, that it is often difficult to draw sharp lines between their varied forms.

Accounts of the appearance and range of each of these four-and-twenty forms are to be found in Beebe's beautifully illustrated *Monograph of the Pheasants*.

As we are concerned only with the pheasant of the British Isles, we need notice but four of them; these being the only ones that contribute to its composition.

In all the races of pheasant found to the east of a line drawn from Chittagong to the Altai Mountains, and to the north of those mountains, the lower back and rump are lavender blue, greenish or yellowish grey, or olive green with a rusty orange patch on either side of the rump. In the races of pheasant found to the west of the above-mentioned line, the rump and lower back are bronze red, maroon or rusty orange.

All the races of pheasant that dwell east of a line drawn from the north end of Lake Baikal to the east end of the Gulf of Tonquin, those living in Central Asia north of latitude 40° N, and those that inhabit the island of Formosa, are characterised by having round the neck a white ring, varying in breadth and completeness with the race. These ring-necked races are eight in number; the remaining sixteen lack the necklace.

The most westerly of these races inhabits the Caucasus Mountains on the east and south-east of the Black Sea. This form, of course, lacks the white neck-ring. It was the pheasant with which the Greeks came in contact when they invaded Asia. The fine bird appealed to

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them, and they brought living specimens back to Greece along with their other spoil

Legend hath it that Jason introduced the bird into Greece, bringing it with him on his return from the Argonautic expedition. The Greeks were certainly acquainted with the pheasant in very early times. It is mentioned by Aristophanes in his play, "Nubes," written in 400 B.C. His reference to the pheasants fed by Leogorus, a noted epicure, shows that in his day the Greeks bred them for the table. The Romans did likewise. They took their domestic pheasants with them to the outlying parts of their Empire, and it would seem that they introduced the bird into England. As their dominion did not extend to the territories of the Picts and Scots, it is unlikely that the pheasant reached Scotland through their agency. It is said that it was introduced into that country early in the nineteenth century by Lord Willoughby d'Eresby, who released some of the species on his estate in Perthshire.

There is, however, evidence of the occurrence of the pheasant north of the Tweed long before that date. James VI of Scotland, in 1594, prohibited the shooting of pheasants. In Ireland the bird seems to have been comparatively common by 1589.

Thus the pheasants originally introduced into England lacked the white neck ring. The race to which they belonged is known as *Phasianus colchicus*—the Caucasus pheasant. It occurs abundantly in the valley of the river Rion, known in classical times as the Phasis, whence the name *Phasianus Colchicus* is derived from Colchis, the country through which the Rion flows.

The pheasants which are so abundant in the eastern part of China have a well developed neck ring, in consequence they are known as the Chinese or ring-necked pheasant (*Phasianus torquatus*).

When trade with the Far East began to open up in the eighteenth century, the beautiful pheasants offered for sale in the markets of the treaty ports of China, and the green species exhibited in the bazaars of Japan, were purchased by British seamen, who brought them home. The exact date on which the first of these pheasants was introduced into England is not known. There is, however, evidence that the ring-necked variety had been imported by 1741, also that

in the following year another kind—almost certainly the Japanese form—came into the country.

The former, once known to Englishmen, was imported in considerable numbers, and by the middle of the century it was not uncommon in bird-fanciers' shops. Pennant mentions having seen one in Holborn in 1768. Numbers of landowners procured these birds and turned them out into their coverts.

Latham states (*General History of Birds*, vol. 8, p. 190) that the Duke of Northumberland, about the year 1780, liberated large numbers of these birds under the name of Barbary Pheasants, in his grounds at Alnwick. Lord Carnarvon did likewise at Highclere, in Berkshire; and the Duchess of Portland, at Bulstrode, Bucks. Their example was followed by many others. Latham wrote, in 1823, the ring-necked variety "is daily becoming more common." He adds: "it is true that these mix and breed with the common sort, and that in such produce the ring on the neck is less bright and sometimes incomplete."

The Japanese pheasant (*P. versicolor*) and the Mongolian (*P. mongolicus*) have also been crossed with the British race, but not to an extent sufficient to affect the appearance of the majority of individuals.

Thus the pheasant of Britain, like the human inhabitants, is of mixed descent. It is based on the Caucasian race with a considerable admixture of the ring-necked, and a slight mingling of the Japanese and Mongolian races. Even in localities where none of the last three races has been liberated, the birds probably have mixed blood in their veins owing to the interchange of eggs in order to obviate in-breeding.

Although descriptions of plumage afford the duldest of reading, a few details regarding the colouring of the Caucasian pheasant, and a note of the chief differences displayed by the other three races, may not be devoid of interest.

P. COLCHICUS. Male. Eyes yellow. Round each eye is a zone of granulated scarlet skin, finely spotted with black. Under each eye there is at the breeding season a patch of glossy dark purple feathers. There is no white ring separating the neck from the breast and

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back The upper part of the head and neck are deep purple with a sheen that sometimes looks green and sometimes blue The lower parts of the neck and breast are golden bay glossed with purple in front and at the sides, and many of the feathers are tipped with purple The rump is dark maroon The small feathers of the wing are pale brown The tail feathers are olive, edged with reddish brown and narrowly cross barred with black

* *Female* Upper parts mottled fawn, dark brown and black, lower parts fawn with faint black freckles

P *TORQUATUS* *Male* Differs from *colchicus* (1) in having white eyebrows and a white ring encircling the lower neck, (2) the feathers of the rump being grey, each with a narrow green cross-bar, (3) the wings being grey where those of *colchicus* are brown, and (4) the cross-bars of the tail being broader

Female Resembles female of *colchicus*

P *MONGOLICUS* *Male* Prevailing hue, coppery red Differs from the other three races in (1) the eyes being straw-coloured, (2) having no patch of feathers on the bare skin of the face, (3) the front of neck and breast and the flanks being coppery red, (4) having a white neck-ring interrupted in front, (5) the dark markings of the breast being indistinct, and (6) the small feathers of the wing being white He is larger than the other pheasants, and when crossed with *colchicus* produces a fine bird of which the plumage is mainly coppery red, the throat and breast being of this hue shot with purple During the breeding season the red face skin dilates only below the eye, and not above also, as happens in the case of the other races

Female Plumage of paler hue than that of *colchicus* and *torquatus* Eyes* straw-coloured

P *VERSICOLOR* *Male* Prevailing hue green, hence this species is often called the Japanese green pheasant Neck rich purple without a white neck-ring Head, upper back, throat, breast, flanks and lower parts dark metallic green Rump slaty green Shoulders coppery red, each feather having a buff band Wings bluish slate marked with buff, brown, chestnut and white Tail greenish grey, ~~tinged with purple and cross-banded with black~~

Female Smaller and of darker hue than those of other three

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rices, especially on the lower parts where the feathers are mottled with black.

The Japanese pheasant is smaller than any of the others.

That the British race of pheasants has derived benefit from being crossed with the Chinese (ring-necked) race there can be little doubt. The latter is the finer bird: evidence of its adaptability is afforded by the manner in which pheasants—mainly ring-necked—introduced into North America flourish, despite the rigours of the winter climate. They seem to thrive there better than do the indigenous grouse, even as the British pheasant does better than the native blackgame in this country.

Whether extensive crossing with the green Japanese pheasant would be productive of equally good results it is impossible to say. The cross is a large and exceedingly beautiful bird: it has been called "Russell's Perfection."

The cross with the Mongolian pheasant has, writes the Hon. Walter Rothschild (*Field*, June 20th, 1903), "proved much superior in flavour and size to ordinary pheasants." It is, however, said that in England (not in Scotland) on account of the mild climate and high feeding the pure Mongolian grows too gross to afford good sport.

Detailed description of the English pheasant is impossible because owing to its mixed descent individuals vary greatly. Its general colouring is that of the Caucasus pheasant.

The Chinese strain in the British race of pheasants is usually shown by the presence of a more or less complete white neck-ring, and some green on the lower back. Even in pheasants which lack the neck-ring, as Ogilvie-Grant has pointed out, the foreign blood shows in the form of a sub-terminal green bar on the feathers of the
er back and broad transverse black bars on the basal part of the
tail feathers.

oter on the coloration of game birds it is mentioned
'es of sexually-dimorphic species sometimes assume,
ompletely, the livery of the male. This frequently
pheasants.

ion was the subject of scientific papers by St.

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Hilaire in 1825 and Yarrell in 1827 A stuffed specimen of such a hen is exhibited in the South Kensington Natural History Museum

The assumption by the hen of male plumage is rarely complete A hen having patches of scarlet skin on the face is very uncommon, although normally-coloured hens sometimes display rudimentary spurs Other male characteristics occasionally exhibited by hen pheasants are crowing and a propensity to kill the chicks of other hens

Most ornithologists assert that the hens which assume male plumage are spurned and buffeted by both sexes Mr Frank Finn, however, informs me that a hen pheasant in the Zoological Gardens, London, who assumed male plumage gradually as the result of successive moults, was not molested by her companions Usually when a female assumes male plumage, her breast feathers are the first to show colour

Colour sports not infrequently occur among pheasants indeed they seem to be unusually common

One of these is the form erroneously called the Bohemian pheasant In this the pale parts of the plumage are greyish or yellowish white, giving the bird a faded appearance

White and pied individuals are not very uncommon

The Countess of Ilchester records having in her possession a young Mongolian pheasant of which the wattles are completely covered with brilliant feathers coloured like those of the neck This bird has a feathered pendant hanging from the fore neck

A curious sport has appeared of recent years The female is chocolate in ground colour, each feather being peculiarly marked with black and narrowly edged with buff The effect of this marking, although the details are not the same, is to give the bird the appearance of being feathered like the red grouse The male has the head, neck, breast and upper flanks velvety purplish green, the last being ticked with straw colour The rump is olive The small feathers on the wings are pale brown The lower parts are dull, dark, smoky brown There is an entire absence of chestnut in the plumage Both the male and female may have irregular white patches on the head and neck The down of the chicks is of chocolate hue Although the

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cock resembles in some respects the Japanese pheasant, he differs in the colour of the rump and small wing feathers; and the female is very unlike the Japanese hen. Thus it does not seem probable that this form is the result of the Japanese crossing with the ordinary pheasant. Hachisuka considers it a new sub-species and styles it *Phasianus colchicus obscurus*.

These sports or mutants are of great interest to zoologists. They seem to offer the true explanation of the origin of new species. We do not know what causes such sports to arise, but sometimes a particular sport appears in numbers. If it be unable to hold its own in the struggle for existence it goes under. If it be as well or better equipped for the struggle, it is likely (unless its peculiarities are swamped by cross-breeding) to give rise to a local race or sub-species. This again may later throw off further sports, and so in time a new species may arise.

The flesh of the pheasant is held in high esteem by all carnivores, whether furred or feathered; hence the bird is preyed upon by them as well as by man. Its chief foes are foxes, jackals, weasels, stoats, mongooses, leopards, polecats, dogs, falcons, sparrow-hawks and other birds of prey, and owls. Rats, rooks, jackdaws, crows, kestrels and hedgehogs devour the young. Crows, rooks, jackdaws, magpies, squirrels, rats and hedgehogs eat the eggs.

Numberless are the devices to which man resorts in order to snare pheasants. The fact that the males at the breeding season are attracted by the flapping of the wings of their rivals is made use of by the human inhabitants of most parts of Asia to snare them. Mr. W. Beebe states that in Lenkoran the method adopted is to sew together the eyelids of a domestic fowl to prevent it flying or running away and place it by a log behind which squats a man armed with a stick with which to prod it to cause it to flap its wings. The cock pheasants thereby attracted are killed by a man in hiding. Sometimes, in lieu of a fowl, an apparatus that makes a noise like the flapping of wings is employed to lure cock pheasants to their doom.

In Europe the poacher takes advantage of the pugnacity of the cock pheasant to capture him. A game-cock, provided with arti-

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cial spurs as sharp as needles, is set down and made to crow. Any pheasant who accepts the challenge is settled by a single stroke of the artificial spurs.

A favourite poaching trick is to burn brimstone under a tree in which pheasants are roosting, the birds fall to the ground senseless.

Sometimes peas are softened by being soaked in water, then a needle is driven through each and cut down, so that about a quarter of an inch projects from the surface of the pea. The peas so prepared are scattered on ground where pheasants are known to feed. A bird, having swallowed one or more of these, experiences a choking sensation and creeps to the nearest cover where it is picked up half dead.

Pheasants are often caught by means of fish hooks baited with raisins.

As it is encompassed by so many ruthless enemies, the pheasant might reasonably be expected to be provided with powerful offensive weapons, or at least to be inconspicuously attired and endowed with great powers of flight. This is not the case. The cock, it is true, is equipped with spurs, but the hen has no weapon of defence except her comparatively inconspicuous plumage. She seems to illustrate the truth that the meek inherit the earth.

The powers of flight of the pheasant are comparatively weak. The wings seem to be small for the size of the bird, especially when the length of the tail is taken into consideration. They are short and rounded like those of the partridge. They are flapped very vigorously during flight, in consequence their possessor propels itself with considerable velocity through the air, but the flight entails such effort that it cannot be sustained for any length of time. It is doubtful whether a pheasant is able to fly much more than a mile at a stretch. The birds who performed a flight of at least four miles over water—as recorded by Mr J. Cordeaux—must have been assisted by a strong following wind. Mr J. G. Millais states (*Natural History of Game Birds*, p. 84) that in December 1890, three pheasants failed to cross Loch Ness at a place where it is a mile and a half broad. They alighted on the water where they were captured by men in a boat.

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"The pheasants on the island called Isola Madre, in the Lago Maggiore at Turin," writes Bingley (*Animal Biography*, vol. 1, p. 238), "as they cannot fly over the lake, are altogether imprisoned. When they attempt to cross the lake, unless picked up by boatmen, they are always drowned."

The pheasant, however, can fly at considerable speed for a short distance. At what rate the bird can travel when pressed I am not able to say. The determination of the pace at which birds move through the air is most difficult to determine with any degree of accuracy. Probably no bird ever really extends itself except when being pursued by a falcon. Experiments show that pheasants ordinarily fly at anything from twenty-five to thirty-eight miles an hour. Mr. C. A. F. Portal, however, declares (*Field*, February 18th, 1922) that they can attain a speed of sixty miles an hour. Those interested in the matter are referred to Mr. H. S. Gladstone's *Record Bags and Shooting Records*. If these lines should meet the eye of anyone unacquainted with this work, I recommend that person to procure it. The main title does not indicate its scope. It gives, in addition to a large number of shooting records of all sorts and conditions of game both at home and abroad, "some account of the evolution of the sporting gun, marksmanship and the speed and weight of birds." I venture to assert that the compilation of the book in question has involved more painstaking research than that called for in the preparation of any literary work other than a dictionary or encyclopedia. The book, although it bristles with figures, affords most entertaining reading.

The pheasant, although not a long-distance flier, is fleet of foot. It prefers using its legs to its wings. This tendency renders difficult the conduct of a battue: the birds are very apt to break back and run between the beaters.

Pheasants live by preference in forests where they are comparatively immune from attacks by birds of prey. Forests, however, are scarce in many parts of their range. In open country they keep to localities that afford cover. They are extraordinarily adept at concealing themselves; one will hide itself completely in a tussock of grass. The pheasants in the rice-growing area of China are well

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sheltered while the crops are high. When the fields are bare, or the rice is young, they lie up in the grass that covers the partitions between the fields.

The pheasant, when it has to feed in the open, rarely ventures far from cover. It trusts to its legs, or its capacity for a short rapid flight, to enable it to reach this when danger threatens.

The pheasant is doubtless assisted in the struggle for existence by the possession of a large crop—an organ which is well-developed in game birds and pigeons.

This is a bag into which food passes from the gullet. Its walls do not secrete any digestive juice, it is merely a receptacle, an internal pocket, in which food can be stowed as a monkey tucks nuts in his distensible cheeks. Owing to its having a crop, the pheasant is able, where food is abundant, to eat a meal in a few minutes. If it has to expose itself when feeding, it swallows its food in feverish haste and then seeks cover when the food taken into the crop passes slowly into the stomach to be digested. The crop serves the same purpose as the paunch or ruminating pouch of deer and cattle, it is a considerable appendage of birds which have many enemies. It is small in birds of prey, these, like the hero of a well known song, "fear no foe." The stomach of the pheasant and other game birds is composed of two divisions. That into which the food passes first is styled the proventriculus. It is here that the gastric juice is supplied. From this the food passes into the gizzard, the walls of which are very thick and muscular. In this the grain and other hard food eaten are ground to a pulp. In order to assist in the grinding pheasants and other game birds swallow a quantity of stones or grit. Owen compares the crop of a bird to the hopper of a mill, since it supplies to the gizzard to be ground small successive quantities of food as it is wanted.

Although pheasants seem to roost by preference on the ground their perching powers enable them to spend the night in trees when danger compels them to do so.

The pheasant has acute powers of hearing and is very wary. Its clutch of eggs is large, and, if this be destroyed, as soon as possible is usually laid. This capacity helps the pheasant to cope with the

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dangers to which the eggs are exposed owing to the fact that they are laid on the ground in a slight nest.

Possibly more valuable than any of the above assets is the great adaptability of the pheasant. Its power of adaptation is almost as great as that of the brown rat. We have already noticed the varied environments in which the pheasant flourishes. It can withstand a considerable degree of cold and damp, and probably heat. It has bred in captivity at Calcutta. Its absence from the forests of India may be due to its being unable to contend against the kalij pheasant and the red jungle-fowl.

Thus despite its many foes, small wings, the showy plumage of the cock and the hen's habit of nesting on the ground, the pheasant has been able to hold its own well in the struggle for existence.

It is interesting that the most gaily-attired race of the species—the ring-necked—is the most widespread. In the same way, one of the most showy of the ducks—the mallard—is the most successful. Facts such as these seem to indicate the comparative unimportance of protective coloration as an asset in the struggle for existence.

In Asia the pheasant feeds mainly in the early morning and the evening; in England, where it suffers comparatively little from the depredations of birds of prey, it seeks its food during the greater part of the day. When the crops are standing it spends much time in them. It partakes of both vegetable and animal food. It is very partial to peas, beans, buckwheat and, indeed, every kind of seed. It also eats turnips, plums, apples, pears, cherries, mulberries, blackberries, currants, mistletoe berries, acorns and even nuts.

It is fond of raisins and Jerusalem artichokes. According to Selby it never misses an opportunity of obtaining the root of the garden tulip, "which, by means of its bill and feet, it is almost certain to reach however deep it may be buried." In May and June it is said to subsist largely on the root of the bulbous crowfoot.

The pheasant scratches up its food after the manner of the fowl.

The animal portion of its diet includes earthworms, wireworms, snails, and many kinds of insects. More than one thousand grubs of the crane-fly (daddy-long-legs) were found in the crop of one pheasant, and no fewer than twelve hundred wireworms in that of

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another Waterton states that pheasants exterminated the grasshoppers on his estate. The bird has been observed to devour field voles and small vipers. The cock is not above eating the young of his own species.

The farmer, perhaps not unnaturally, is inclined to regard as a pest any bird that eats corn. The only reliable method of determining whether a species is beneficial, injurious, or neutral to the agriculturist is to ascertain what the crop contains at each season of the year.

Miss Evershed and Dr W. E. Collinge have examined respectively 303 and 183 pheasants' crops. As the result of their observations they are of opinion that the pheasant is decidedly beneficial to the farmer.

Collinge states that twenty three per cent of its food consists of injurious insects and the greater part of the remainder is composed of seeds of harmful weeds. "There is," he writes (*Food of Some British Birds*, p. 290), "a considerable amount of evidence to show that pheasants are frequently blamed for the misdeeds of other birds, particularly the wood pigeon and the rook."

Mr F. W. Frohawk gives (*Field*, March 8th, 1928) some remarkable figures showing the extent to which the pheasant is insectivorous in mid winter.

The pheasants introduced into the United States of America are much esteemed by farmers as destroyers of injurious insects.

It is commonly asserted that the pheasant is a polygamist. This is certainly true of the bird in captivity, where the breeder allows each cock from four to six hens. Whether the cock is habitually a polygamist in a state of nature is open to doubt. It seems that whenever the opportunity offers he will take unto himself more than one wife, indeed he is not above seducing a farmyard hen if he can overcome the cock in combat. Mr J. G. Millais tells of a cock pheasant who had a harem of seventeen wives!

There is much fighting among cock pheasants at the mating season, in this they peck and grip more and spur less than the game-cock does.

Whether this fighting is for females or breeding territory has yet

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to be determined. Mr. Eliot Howard and others have noticed that at the nesting season the males of many species seek to hold against all rivals parcels of territory, and fight all intruders.

We must bear in mind, however, that fighting is not confined to the breeding season, and that young birds begin to fight as early as September; moreover, combats take place between females, and the cocks sometimes attack hens and spur them severely.

Again, some species, commonly said to be polygamous, are in reality promiscuous; the males mating with several females, and the females with several males.

Mr. Edmund Selous has proved that this occurs among tuffs and reeves.

It may well happen that a hen, having mated with a cock pheasant, may be covered by another cock on a subsequent day, while her first mate is absent in his search for other wives. I doubt whether the cock pheasant habitually collects a harem of hens that follow him about at the nesting season, and I find it difficult to believe that in a state of nature every year only one-fourth or one-third of the cocks ready to pair secure mates, the remainder being compelled by force of circumstances to live in a state of bachelordom.

Mr. Ogilvie Grant is of opinion that the pheasant in England is not by nature polygamous, and that the male usually protects the incubating female and tends the young. The cock certainly occasionally sits on the eggs during the absence of the hen. Wormald had in his possession a cock pheasant who us-
 Tegetmeier records (*Pheasants*, p. 18) the case of a cock looking after a brood of which the mother had evident-
 to grief.

The truth of the matter appears to be, as Millais and Beebe assert, that under natural conditions the pheasant is polygamous or monogamous according to circumstances.

As the cocks are more gaily plumaged than the hens, they are more handicapped in the struggle for existence; it is therefore probable that a greater proportion of them fall victims to predacious creatures; so that, if the sexes are hatched in equal numbers, the

females will preponderate at the breeding season, and this is likely to result in polygamy

That the thinning of the cocks, if done judiciously, does not lead to the diminution of the number of individuals of the species in any given locality, indicates that polygamy is practised when the males are in a minority. Mr. Wilson found this to be so in the case of the monal or Impeyan pheasant (*Lophophorus refulgens*) and the tragopan (*Tragopar melanocephalus*) in the Himalayas. For thirty years he sent home annually from one thousand to fifteen hundred skins of the cocks of these species, but preserved rigidly females and nests. At the end of the period the woods contained as many, if not more, of the birds than at the beginning.

Writing of the ring-necked pheasant, Mr. Beebe says, "Cocks may become so numerous in a locality as to interfere seriously with the breeding. They disturb the hens while sitting on the eggs, and often acquire the egg-eating habit, if they do not actually kill the young birds. Two cocks have been observed to fight so fiercely and continuously that they have driven a hen from the nest and smashed all the eggs."

The fact that one cock can serve five or six hens helps us to understand why natural selection has not been very severe in eliminating the cocks that have showy plumage. Their conspicuousness may lead to the destruction of many individuals, but provided twenty per cent. of the cocks live long enough to breed, this is not harmful to the species, indeed it is beneficial, since it tends to prevent the sitting hens being harassed by amorous cocks and at the same time lessens the demand on the food supply of a locality.

Most birds become very vociferous and active at the breeding season.

Song, dance and display are undoubtedly outlets for the superfluous energy stored up at this period. The males indulge in them to a greater extent than the females, because the latter have, in the production of eggs, a more useful outlet for their energy.

Whether all this singing, dancing and displaying serves any purpose other than the absorption of surplus energy has been the subject of much discussion.

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As Mr. Eliot Howard has pointed out, song sometimes serves another purpose. In the case of species that appropriate breeding territory it is the equivalent of the sign-board "Tresspassers will be prosecuted." By indicating that the singer, being in possession of territory, is ready to fight all intruders, it prevents other males inadvertently trespassing and so averts much fighting. In the case of migratory species, of which the males reach the breeding grounds before the females, the songs of the former enable the ladies in search of husbands to locate unmated males.

It is doubtful whether dancing and display serve any purpose other than the using up of superabundant energy. We have noticed that the display of the male seems to have no attraction for the female. The movements are mechanical and stereotyped. It is possible to classify them. The display of male game birds is either frontal or lateral. In the former, the male, when showing off, fronts the female and droops both wings. This is the method of the peacock. In the other case the bird displaying exhibits one side of his body to the female and lowers only the wing next to her. This is the method adopted by the farmyard cock and the pheasant.

When the latter shows off, his facial skin is inflated, his ear tufts are erected, his plumage is puffed out, and the upper surface turned towards the female, and the wing nearest to her is lowered so that it nearly touches the ground.

Far from showing appreciation of the display she often walks away; then the cock runs ahead as if to bar her passage.

Such conduct on the part of the cock certainly has all the appearance of courtship, and were we not aware of facts which indicate that it is not, and did not we know that the mental concepts of birds are not those of human beings, we should be inclined to agree with the Rabbi Jochanan when he says: "Had the law never been given us we might still have learned politeness from the cock, who is fair-spoken to the female in order to win her. 'I will buy thee a dress,' he whispers in the hen's ear, 'a dress that shall reach down to the very ground.' And when the victory is achieved he shakes his head solemnly and cries: 'May my comb perish if, when I have the means, I do not keep my word.'"

THE PHEASANT

The call of the cock pheasant is a dissyllabic crow—*or—ork*

It is not confined to the breeding season. The cock pheasant invariably crows before flying to the roost, hence the owner of a covert, by counting the calls at nightfall, is able to estimate to a nicety the number of cocks it holds. The male flaps his wings vigorously immediately after crowing, occasionally the flapping coincides with the crowing.

• Mating takes place in March in England, earlier in warmer countries. Breeders put the selected birds together in February, and look for eggs about the second week of April. In warm seasons, however, pheasant chicks may appear by the middle of that month.

The pheasant, in common with most game birds, nests on the ground. A slight depression is scraped in the earth, usually in a secluded spot, which may be in the undergrowth of a wood, or a tussock of sedge or grass.

Occasionally the eggs are deposited in more elevated situations, such as a haystack or the top of a wall overgrown with ivy. Nests have been found as high as thirty feet from the ground. Discarded nurseries of other birds are sometimes made use of, those of the wood pigeon, sparrow-hawk or owl being most often requisitioned. At times a squirrel's drey is utilised.

From such elevated nests the young birds, soon after they are hatched, drop to the ground without hurt, so light and fluffy are they. Mr B van de Weyer records (*British Birds*, vol xiii, p 87) coming upon six pheasant nestlings and an addled egg in a sparrow-hawk's nest at an elevation of twenty-six feet. When a man began to climb the tree in which the nest was situated, two of the chicks dropped to the ground, two more did likewise just as he reached the nest. The remaining two he brought down. The chicks that had dropped were seen to run to the mother bird, apparently unharmed by their fall.

Eggs in nests on the ground are more exposed to danger than those in elevated situations. The reason why pheasants and other game birds nidificate on the ground is doubtless their inability to build a nest. All they can do is to place some material on a flat surface. They select sites on the ground because usually there alone

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can they find the necessary surface. If an elevated site be available it is sometimes chosen by the pheasant. Such conduct is not peculiar to this species. Peafowl seem to make the nest by preference on an elevated site if such be available. In India I have come upon their nests on the roofs of deserted huts in the forest, and on top of creeper-covered arches spanning a drive in a garden. If my memory is not at fault, peafowl kept in the Zoological Gardens at Lahore used to nest on a roofed-in platform. A pair of red-wattled lapwings (*Sarcogrammus indicus*) laid and hatched out their eggs on the flat roof of the court-house at Ghazipur, and there are several cases on record of this species nesting on the roof of a bungalow.

If platforms were provided in secluded spots, it is not improbable that pheasants might make use of them. It is impossible to predict what would happen in such circumstances, because there is no accounting for tastes of birds in connection with nesting sites. As the ground offers an almost unlimited number of sites, there is nothing to prevent pheasants nesting in isolation; nevertheless two, or even three, will occupy a joint nest.

A partridge and a pheasant not uncommonly share a nest. Pheasant's eggs have been found in the nests of the following species: grey-hen, grouse, capercaillie, corncrake, fowl and mallard.

The eggs normally are of olive-brown hue, but many are tinted with green; some may fairly be described as blue-green. All are devoid of markings.

The number in the clutch varies from six to twelve, or even fourteen.

A pheasant can be made to produce many more eggs than she would otherwise do by the simple process of removing, during her absence from the nest, one of the eggs after she has laid two or more. The removal, if made while she is present, may result in her deserting. Many keepers by this means induce a pheasant to lay six or seven additional eggs which they incubate under a domestic hen. Some owners object to the practice on the ground that causing a bird to lay more eggs than nature designs weakens her, and she produces sickly chicks. This objection is well founded if the process of abstraction is carried too far.

My friend, Mr. Frank Finn, records on page 151 of his most excellent book, entitled *Bird Behaviour*, that by taking away one egg at a time, a hen silver-pheasant was made to lay no fewer than seventy eggs in one season; but she was so exhausted thereby that she did not produce any in the following year

In my opinion the taking of half a dozen eggs from a hen pheasant in the season does no harm to the breed, because, in a state of nature, ground-laying birds often lose a whole clutch and, when this happens, a second one is almost invariably laid. This laying of a second clutch to replace the first appears to be an important provision of nature for the welfare of the species. The destruction of the eggs and young of birds that nest on the ground is so great that but for this power such species might not be able to hold their own in the struggle for existence.

Pheasants in England are so carefully preserved, and their enemies so rigorously destroyed, that they and their eggs suffer far less from their natural enemies than they do in the wild state, thus the owner of pheasants, who induces his birds to lay extra eggs by abstracting some, merely takes with one hand what he gives with the other. Moreover, preserved pheasants are provided with abundance of food and so receive sufficient sustenance to enable them to produce more than the normal number of eggs. There is evidence that a plentiful supply of food increases the egg-laying capacity of some birds.

The effect of external stimuli on egg-production is a matter of considerable economic importance.

Mr Edgar Chance discovered (*The Cuckoo's Secret*) that the stimulus which causes the cuckoo to lay eggs is the sight of her dupes building a nest. A cuckoo under observation in 1920 laid no fewer than twenty-one eggs in consequence of Chance providing her, every alternate day, with a meadow-pipit's nest ready for the reception of her egg. In the following year he gave up providing nests before the laying season was over, in consequence the same cuckoo laid only fifteen eggs.

Cold tends to inhibit laying. Mr J. G. Millais writes (*Natural History of Game Birds*, p. 88). "If wild pheasants which have laid

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six or eight eggs are checked by a cold wave, they will lay no more, but commence to sit."

Apparently what happens is that at the breeding season a considerable number of incipient eggs forms in the ovary. The process of ripening continues, and eggs are protruded until something checks it. This may be cold; more usually it appears to be the desire to incubate. Incubation seems to inhibit the development of the egg within the ovary, and, in consequence, to lead to the cessation of egg-laying. The desire to incubate is roused by the sight of a full clutch of eggs, the number varying with the temperament of the individual bird. By removing an egg now and then and so preventing the clutch from attaining this size, the stimulus to incubate is kept back and thus the ordinary limit to egg-laying is removed.

The above, however, are not the only factors concerned, as would appear from the following (*Baily's Magazine*, November 1884) "A hen (pheasant) was shot by accident while sitting on nine eggs and on being dressed for the table, her ovary was found to be empty: whilst another, also killed by accident, and which was known to have laid before its death seven eggs, was found to contain twenty-three eggs in every stage of development, from one or two almost ready for extrusion to others about the size of a bean."

The period of incubation varies from twenty-one to twenty-five days.

The variation is probably due in part to the vagaries of our climate, and in part to some hens sitting more steadily than others.

The chicks, when they emerge from the egg, are covered with soft down of pale brown hue, striped longitudinally with black. They are able to run and pick up food. Shortly after they are hatched the mother takes them off in search of food, leaving any eggs that have not yielded chicks, even though they be on the point of hatching.

Young pheasants are adepts at taking cover, doing so whenever the mother utters her warning call. They remain with her for some months. Their first plumage is acquired in the autumn; in this the cocks resemble the hens, but they soon develop male characters and are ready to breed before they are a year old.

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The pheasant is not so good a mother as the partridge. When surprised with her brood she does not show fight or flutter about as if lame or suffering from a broken wing, but flies away leaving them to their fate. Last year, on Ham Common, a hen pheasant rose about four yards from me. Running to the spot at which she rose, I came upon two chicks which I caught. Had the mother bird not disclosed her presence by taking wing, I should have discovered neither her nor her young.

Mr. B. J. Ringrose records (*British Birds*, vol. xxi, p. 48) that a hen pheasant, flushed by him, flew across the Hampshire Avon. From the far bank she called to the brood she had deserted. These at once took to the water. Six reached the other bank and two were drowned.

This incident illustrates admirably the extent to which young birds are equipped by nature. Those chicks had not been taught by their mother to swim.

Pheasants' eggs are often hatched in incubators and under domestic hens.

Pheasant-rearing is a well-established industry in England. A well-known book on the subject is Tegetmeier's *Pheasants*. In the spring of 1927 appeared in *Country Life* a series of articles on pheasant-breeding by Lord Fisher of Kilverstone.

As in the case of other game birds, there are two methods of shooting pheasants, that of walking up the birds, and that of having them driven to the sportsmen. Some speak of the former as wild-pheasant, and the latter as tame-pheasant shooting.

Although good shooting is obtainable in some parts of the country by sending spaniels or setters into spinneys or osier beds, the cover is, in most places, too dense for this, hence covert-shooting or the battue is the common form of shooting.

Old-fashioned sportsmen are apt to wax sarcastic over this. "As well," writes "Stonehenge," "might 'mobbing' a fox be called hunting as a battue be considered as genuine pheasant shooting." Others dub it butchery. This is hardly fair. The shooting of birds as they emerge in crowds from a covert entails but little exertion, and sometimes little skill. If, however, the birds are "shown" well,

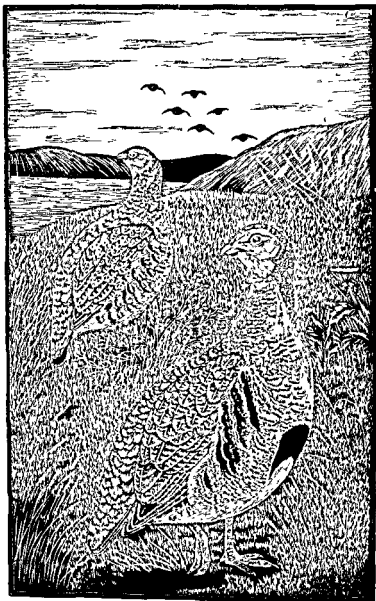
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the battue offers many pretty shots. As to calling such shooting butchery, we must remember that the birds have been bred by the owner at considerable expense in order to shoot them, and it is no more immoral to shoot them than it is to kill poultry for the market.

Is it not more just to say that shooting driven birds is a sport entirely different from shooting birds flushed by dogs or put up by sportsmen?

The former is akin to firing at a moving target on a rifle range. The performer is certain of his target. In order to hit he requires skill, but no knowledge of the ways of game birds. The other kind of shooting demands both skill and some knowledge of ornithology, and has an element of surprise which the other lacks.

According to Mr. H. S. Gladstone (*Record Bags and Shooting Records*, p. 67), some of the statements which have appeared in the press regarding the number of pheasants shot in one day are untrustworthy. He has been at considerable pains to investigate the matter, with the result that he is not satisfied that as many as four thousand have been shot in a day in the British Isles. He has collected some interesting statistics relating to bags of pheasants.



CHAPTER VI

THE PARTRIDGE

PERDIX PERDIX PERDIX! This is not the first line of an impressive poem it is merely the scientific name of the common British partridge

This species has been saddled with this apparently tautological name in this wise Linnæus, the father of modern classification, deemed the partridge to belong to the same species as the blackcock, and he styled it *Tetrao perdix* Then came Ray, who pointed out many differences between the two and placed them in different genera The blackcock remained *Tetrao* and the partridge became *Perdix cinerea* This name it retained until the advent of the priority rule necessitated the replacement of *cinerea* by the earlier *perdix*, in consequence the partridge has to be styled *Perdix perdix* As there are several races of partridge, those who call these subspecies and give to each a sub specific name, have, according to rule, honoured the race originally described with the specific name by way of a sub specific one, thereby acting up to the adage *Toujours perdrix*

I am not altogether sorry that "*cinerea*" has disappeared from the bird's name, for this adjective is scarcely just to the partridge, which is a beautiful bird In its own way it is as handsome as the cock pheasant

There are two distinct types of beauty, each of which is to be seen in game birds that of Solomon in all his glory, and that of the lilies of the field

The cock pheasant, as he stands iridescent in the sunlight, may, not inaptly, be likened to an oriental monarch, much bejewelled and arrayed in robes of brightly coloured silk and cloth of gold Such a simile could not appropriately be applied to the common partridge, whose beauty is rather comparable to that of distant hills, fleecy clouds and soft sunsets

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Every feather is a thing of beauty, exquisitely wrought and delicately painted. Some are French grey washed with fawn, and finely marked with brown or buff, or boldly cross-barred with chestnut; others are black with buff markings. The crown is reddish brown. The sides of the head and throat are of rusty hue. Behind each eye is a patch of scarlet skin. The breast and flanks are blue grey, mottled with black and buff. The former displays a patch of bay or bright chestnut, which oftens takes the form of a horse-shoe. The lower parts are white. The flight feathers are brown with buff cross-bars. The tail exhibits a pleasing pattern of chestnut, buff, fawn and black.

The female differs little in appearance from the male. She is a trifle smaller. It is often said that she lacks the bay horse-shoe patch on the breast. Montagu, however, demonstrated nearly one hundred years ago that this is by no means always so. He happened one day to kill nine adult birds which displayed very little variation as regards the chestnut markings on the breast. On dissection, five of these proved to be females. Thus the horse-shoe test is not a safe one, although it holds good in the majority of cases. According to two authorities—Messrs. Ogilvie-Grant and F. M. Ogilvie—the horse-shoe is usually best developed in young females.

Hen partridges seem to fall into three classes: those in which the horse-shoe is well developed; those that have chestnut patches on the breast in place of a horse-shoe; and those which show no chestnut. These last are often said to exhibit a white horse-shoe.

There are three methods of distinguishing the cock from the hen partridge.

(1) A difference, first noticed by Mr. Ogilvie-Grant, in the markings of the shoulder feathers and the soft feathers of the wing. In the female these are mostly black with wide-set buff cross-bars; in the male the cross-bars are absent; their place is, however, sometimes taken by a russet patch.

(2) As was first observed by Mr. Millais, the crown of the male is uniform chestnut brown, with very small paler shaft stripes; whereas the shaft stripes of the female are pale buff and much larger.

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(3) According to the French naturalist, M Louis Bureau, the female has on the upper plumage yellowish drop-shaped markings which the male lacks

No one of these tests, taken by itself, is infallible, nor do they apply to birds less than fifteen months old These may be readily distinguished from older birds by the outermost flight feather being pointed instead of rounded at the tip

* In this connection it must be remembered that females which have become sterile sometimes assume male plumage Speaking generally, the colouring is brighter in the male, especially in the breeding season

As in the case of many game birds, partridges vary greatly in colour Some are very grey, particularly those of the Pyrenees, and, to a lesser extent, the birds inhabiting the northern slopes of the Pennines

Then there is a red variety, often called the mountain partridge, which itself shows great variations Apart from the head and upper neck which are buff, the remainder of the plumage has a distinctly bay or chocolate red hue Sometimes the red is mottled with cream, at others it shows itself as cross bars Occasionally pure white or pied partridges are seen, and, more rarely, almost black varieties Indeed, there seems no limit to the variations from white to black through buff, red and brown

The partridge, unlike the pheasant, is indigenous to the British Isles

It is, however, by no means confined to our shores Its range extends from Ireland to Central Asia Its southern limit is roughly a line drawn from Oporto to the south of the Caspian Sea

The partridge occurs in all parts of the British Isles where corn is grown It is fond of feeding in the stubbles and is rarely found far from arable land In this respect it differs from the grouse and the ptarmigan

Unlike the pheasant, it does not require shrubs or woods in which to lie up during the day, and it never roosts in trees

Except when nesting, partridges live in coveys—consisting of mother, father and young In winter two or more coveys often join forces

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Partridges rarely, if ever, perch in trees; they feed and sleep on the ground. They roost—"jug" in the phraseology of sportsmen—in a circle, closely packed together, the tails pointing inwards. This is shown by the fact that the droppings of the birds at the roost form one patch, and not a number arranged in a circle, as would be the case if the birds spent the night with their heads pointing inwards, as some declare they do.

A covey jugs at the same spot night after night; in consequence the grass becomes worn there.

In view of the fact that so many night-prowling creatures prey upon the partridge, the habit of roosting on the ground seems fraught with danger.

The sense of smell is highly developed among mammals. Richard Jefferies proved by experiment that a hare can scent from a distance of many yards a man to windward. When setting a snare for a hare he writes (*The Amateur Poacher*, p. 47), "in walking to the spot selected for the snare it is best to avoid even stepping on the run, and while setting it up to stand back as far as convenient and lean forward. The grass that grows near must not be touched with the hand, which seems to impart a very strong scent. The stick that has been carried in the hand must not be allowed to fall across the run; and be careful that your handkerchief does not drop out of your pocket on or near it. If a bunch of grass grows very tall and requires parting, part it with the end (not the handle) of your stick."

Partridges give out a very strong scent which enables dogs and other animals to discover them with ease. How, then, is it that they are not all killed when roosting?

I believe that in such circumstances the birds do not give out scent. It seems to be a well-established fact that birds which nest on the ground do not emit scent while incubating. How is this suppression of scent accomplished?

Many sportsmen believe that birds have the power of withholding their scent at will.

Ogilvie was of opinion that the suppression is connected with the digestive organs, in some way not understood.

Tegetmeier writes (*Pheasants*, p. 74): "I believe . . . that the

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peculiar specific odour of the bird is suppressed during incubation, not, however, as a voluntary act, but in a manner which is capable of being accounted for physiologically. I believe this suppression is due to what may be termed vicarious secretion. In other words, the odoriferous particles which are usually exhaled by the skin are, during such time as the bird is sitting, excreted into the intestinal canal, most probably into the caecum or the cloaca. The proof of this is accessible to everyone: the excrement of a common fowl or pheasant, when the bird is not sitting, has, when first discharged, no odour akin to the smell of the bird itself. On the other hand, the excrement of a sitting hen has a most remarkable odour of the fowl, but highly intensified. We are all acquainted with this smell as increased by heat during roasting, and practical poultry keepers must have remarked that the excrement discharged by a hen on leaving the nest has an odour totally unlike that discharged at any other time, involuntarily recalling the smell of a roasted fowl, highly and disagreeably intensified. I believe the explanation of the whole matter is as follows: the suppression of the natural scent is essential to the safety of the bird during incubation, that at such time vicarious secretion of the odoriferous particles takes place into the intestinal canal, so that the bird becomes scentless, and in this manner her safety and that of her eggs is secured. This explanation would probably apply equally to partridges and other birds nesting on the ground."

Mr A S Leslie suggests that when a bird is sitting still the air does not get in among the feathers, so that the scent is not disseminated.

The sitting bird certainly does not voluntarily suppress its scent. Such an act would involve, quite apart from the bird having control over its body metabolism, reasoning power beyond the capacity of any dumb creature.

An objection to Tegetmeier's theory is that it does not explain why a resting bird gives out little or no scent. Leslie states that grouse, when resting at midday, are difficult to find with dogs. It may well be that the metabolism—the chemical changes that constantly take place in the body of a bird—may not be the same when

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the bird is sitting hour after hour on its eggs, as when it is leading an active life. If this be so, it explains the difference in the excrement mentioned by Tegetmeier.

There can, I think, be little doubt that Leslie is right in saying that when a bird is sitting the air does not get in among the feathers, and in consequence any scent it produces is not disseminated. It is said that a shot bird that lies huddled in a heap is not so readily scented by dogs as one that lies with wings extended.

It is my belief that the scent emitted by birds and beasts is produced by the contraction of the muscles, and that none is manufactured while they are roosting, resting or incubating. If, in addition to this, air does not get in among the feathers in such circumstances, it is easy to understand why a dog, when taken within two or three feet of a sitting partridge, or other game bird, often fails to scent it.

Partridges feed largely on grass seeds and other grain, berries and tender shoots, even those of heather. They also eat insects of many kinds, grubs, ants' eggs, small molluscs and worms. They are very partial to aphidæ.

The diet, of course, varies with the season. In England, February and March are the months in which partridges experience most difficulty in finding sustenance, as by that time most of the crop-roots have been pulled up and the fields ploughed. In consequence the birds then flock to clover fields.

Ogilvie states that in Suffolk three quarters of the partridges of each district spend the day in the "maiden layers" of clover, the birds travelling long distances to reach these.

Partridges, although they eat corn, seem rarely to attack it in the ear. They are in no way injurious to the farmer. Dr. Collinge, as the result of the examination of the contents of the crops of 132 birds, states that twenty-three per cent. of the food of the partridge consists of injurious insects. "So far as agriculture is concerned," he writes (*The Food of Some British Birds*, p. 292), "the partridge is a perfectly harmless bird. The percentage of cereals taken is small and restricted to a very short season of the year. It is mostly obtained in the stubbles, but were the percentage much larger, and spread

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over a greater portion of the year, it is more than counterbalanced by the nature of the food during the remainder of the year "

Like other game birds, partridges take in a great deal of grit Major M Portal counted 429 bits of grit in the stomach of an adult female

At seasons when food is abundant, partridges feed from dawn until about 10 a m , and again in the afternoon, lying up during the day in some secluded but open spot " The sort of place which seems to suit them best," writes the Rev A H Macpherson (*The Partridge*, p 23), " is a nice sandy knoll on the side of a hill, screened from inconvenient observation by a light covering of bracken or lady fern " They are very fond of dusty spots In the summer they take a dust bath daily, if necessary, repairing to a road for the purpose

The fact that the grass often becomes worn away at places where partridges roost indicates that they are sedentary birds They seem never to migrate unless driven by necessity to do so When flushed a partridge never flies far During flight the wings move so rapidly as to produce a whirring sound, after a number of beats of the wing the partridge sails for a little on outstretched pinions According to Mr C F A Portal, the maximum speed of the partridge is fifty-three miles an hour, ordinarily, however, it does not seem to travel through the air at more than half that pace

It is said that the partridge is incapable of accomplishing a sustained flight. Bingley writes (*Animal Biography*, vol 1, p 264) " A covey of sixteen partridges, being disturbed by some men at plough, directed their flight across the cliff to the sea, over which they continued their course about three hundred yards Either intimidated or otherwise affected by that element, the whole were then observed to drop into the water Twelve of them were soon afterwards floated to the shore by the tide, where they were picked up by a boy, who carried them to Eastbourne and sold them " It may be that, as partridges indulge in the dust bath, the birds in question were not acquainted with the nature of water

Blakey writes (*Shooting*, p 69) that partridges often take " a mile or two at a bound "

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The species seems very capricious in the choice of a site for the nest. The fact that this is usually well concealed would appear to be due to accident rather than intelligent selection. A bird seems sometimes to go out of its way to make the nest in a spot where it is likely to be destroyed, as, for example, a footpath or a grassy road along which carts occasionally go. Many birds are killed when the pasture in which they nest is mown.

Numbers of nests are made in the rank grass by a hedgerow or a wall. Many are placed in clover fields, usually the nest is situated on a grassy bank up against the trunk of a tree. And it is recorded that in 1788 a partridge formed her nest and that we sixteen eggs on the top of a pollard oak tree in Essex. Seebohm cites (*British Birds*, vol. 2, p. 454) another case of a partridge's nest in an elevated situation.

Into the hollow scratched by the bird a few grasses or dead leaves are brought to form a lining.

Usually the partridge does not begin to lay before the end of April, most eggs appear in May. They, however, have been found as late as the middle of August in England, and September 4th in France. These are probably a third clutch, the earlier ones having been destroyed. It may be said to be almost a rule in nature that when a clutch of eggs is stolen or destroyed a new set is laid, the first egg of the latter appearing a few days after the destruction of the first laying.

W. R. Ogilvie Grant asserts (*British Game Birds and Wildfowl*, p. 145) "If a nest is destroyed after incubation has commenced the partridge seldom nests a second time, but if the bird has not begun to sit, a second and small clutch of from six to ten eggs is often laid." The first part of this assertion is open to question. So great is the destruction of the eggs of ground laying species that one which did not lay again after the first clutch was destroyed would seem to have but little chance of surviving in the unceasing struggle for existence. In fact there are many recorded cases of incubating partridges laying a second clutch after the first has come to grief. Mr. R. Clapham records (*Field*, September 8th, 1927)

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a nest of which the eggs hatched out on August 18th. Dr. Louis Bureau records (*L'Age des Perdrix*) that a clutch of eighteen eggs, on which a hen partridge was sitting was destroyed on May 17th, 1902. The bird made a new nest at a distance of about eighty metres from the first and was found to be sitting on twelve eggs on June 23rd. The same observer records a case of eggs not being hatched until September 4th in France.

Some estate owners, on the principle of avoiding putting all their eggs in the same basket, deliberately take a few of the clutches of their partridges' eggs in order that the birds so treated may lay the in and have late broods. Unless the season is abnormally wet, broods of at least one of the periods should enjoy fine weather.

The eggs of a clutch are laid on consecutive days with an occasional forty-eight-hour interval. Ogilvie, as the result of observations extending over six years, states that on an average one egg is laid every thirty-four hours. The eggs are pale olive brown, without any markings.

There is great discrepancy in the estimates of the average size of a clutch. Millais asserts that it does not often contain more than twelve eggs. His experience seems to be exceptional.

Mention has already been made of the partridge who laid sixteen eggs in a nest on top of a pollard oak, of a covey of sixteen birds that fell into the sea, and of a bird whose eighteen eggs were destroyed.

D'Hammonville, in his *Birds of France*, gives an account of a grey partridge who was thrown off her nest of eighteen eggs by a mowing machine. She returned to these and, two days later, took away a brood of eighteen.

A first clutch of a healthy pair of young birds should number from fourteen to twenty. If more than twenty are found in a nest, the probability is that these are the produce of two hens. Partridges not uncommonly share a nest. In such circumstance the covey may consist of between thirty and forty birds.

Bureau says that in France the first clutch of the season rarely consists of fewer than fourteen eggs. He puts twelve as the average of a second clutch. He asserts that small clutches of from seven to nine eggs are third layings, the first two having been destroyed.

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Probably food supply has some effect on the size of the clutch, but of this, so far as I am aware, there is not proof

The age of the bird, however, undoubtedly affects the number of eggs

Ogilvie, in the course of a truly admirable account of the partridge, writes (*Field Observations on British Birds*, p. 48) 'Partridges are most prolific in their first year. The female hatched in June 1904 will lay a fuller clutch in 1905 than the female hatched in 1903, and their fecundity rapidly diminishes each succeeding year. A female which has survived beyond four years is, I think, for all practical purposes sterile. The same holds good with the males, and it is only from the union of males and females of the previous year that we get a full clutch and a full hatch

"A nest which contains, say, eight or nine eggs when a bird sits is even more unsatisfactory than its paltry number indicates, for, probably, half the eggs in the nest will prove to be rotten. Here one would suppose that the female is old and her ovaries exhausted. A large nest of eighteen or twenty eggs generally hatches out well, but occasionally you will find such a nest which will only yield five or six chickens, or less—and in this case, I believe, we are dealing with a faulty male. When an *old male* has paired with a *young female*, the number of eggs laid seems to show that the latter bird is normally prolific, and the number of bad eggs to show that the fertilisation was incomplete. This all indicates how important it is that young birds should pair together. If it were possible to shoot off all old birds, males and females, at the end of the season, the stock of the following year would be enormously increased."

This theory is in accordance with the short duration of the egg-laying period of domestic fowls

Whether it be sound or not, experience teaches that the killing off of old birds, both males and females, is beneficial to the stock of partridges and grouse

Even as the pheasant may be induced to lay a large number of eggs by removing an egg day after day, after more than one has been laid, so a well fed partridge may be made by this means to produce forty eggs in a season. For reasons given in the case of the pheasant

probably little harm is done to the stock by inducing the partridge to lay a *few* extra eggs in the season.

The hen alone incubates, but the cock keeps near the nest and does his best to defend it from attack. He broods and assists in the care of the young ones.

The hen does not sit until the full clutch is laid. Before incubation begins she keeps the eggs covered with dead leaves. After she has begun to sit she does not cover them when she goes off the nest, but her absences are then brief and far between. Ordinarily she leaves the nest but once in the twenty-four hours, in the morning when the sun is well up.

During the first few days of sitting the hen is liable to desert her eggs upon slight provocation, but the longer she sits the less ready is she to do so; and, when the eggs are about to yield chicks, it takes much to make her desert. Often she will sit until she is trodden upon by a passer-by.

Mr. R. Kearton records (*Wild Nature's Ways*, p. 62) that a partridge, having a nest in a target-pit on a range where firing took place three or four times a week, did not desert until every one of the nettles that formed her cover had been shot away.

Montagu states (*Ornithological Dictionary*) that a hen partridge, which was taken with her eggs on the point of hatching and carried in a hat to some distance, continued to sit in confinement and brought out her young.

When the clover is being reaped, sitting partridges are often cut in half by the blades of the clipper.

The period of incubation is twenty-four days, or a few hours longer.

The young are covered with down and are able to run and pick up food almost as soon as they leave the egg. If some of the eggs do not hatch out at the same time as the others, the hen partridge goes off with her brood, leaving the eggs even though they will yield chicks in a few hours. This is accounted for by the fact that incubation and tending the young are instinctive acts; the bird performing them follows blindly the dictates of instinct, without exercising any reason. The sight of a full clutch of eggs is the stimulus which calls

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forth the incubating instinct, that of young birds stimulates the instinct to tend the young, and, when this appears, the remaining eggs are as pebbles in the eyes of the mother bird. If for any reason all the eggs become addled, the hen will sit for weeks beyond her time in fact until the incubating instinct dies away. In such circumstances she often becomes greatly emaciated, because when sitting she allows herself but little time for feeding.

* As evidence that incubation and tending the young are merely blind responses to stimuli, may be cited the behaviour of a mother starling recorded by Mr R. Kearton (*Wild Nature's Ways* p. 49). During her absence Kearton substituted some dummy eggs for her nestlings. On her return to the nest she gazed for some seconds at, and then sat on, the painted bits of wood, without a trace of sorrow in either look or action.

Although the common and the red-legged partridge not infrequently lay in the same nest, a mixed brood is rarely, if ever, seen, because the period of incubation of the former is a day longer than that of the latter, and as soon as the red-legs are hatched the sitting bird goes off with them, leaving the other eggs to perish.

A parent partridge with young sometimes behaves in a strange manner on the approach of a dog or a human being. Instead of attacking the intruder or running away, it flutters in front of him as though unable to fly. This is usually considered a clever ruse on the part of the partridge to draw the attention of the intruder from the chicks and so give them time to scurry to cover. It must be admitted that such conduct has the appearance of being highly intelligent, nevertheless I believe that it is not a clever trick, but is rather comparable to the behaviour of a human being in a fit. The parent bird, in such circumstances, is, so to speak, torn asunder by conflicting desires—that of seeking safety in flight and that of defending the young. The bird, its mental balance upset, becomes temporarily demented and partially paralysed. If such behaviour results in saving the young without harming the parent, it is clearly beneficial to the species and will be fostered by natural selection.

Want of space prevents me adducing the evidence proving that such behaviour is not a deliberate trick. This is set forth at length

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in my volume, *Birds at the Nest*. Here it must suffice to say that the execution of such a trick involves powers of reasoning and acting far beyond the capacity of any dumb creature. Moreover, a bird will perform "the broken-wing trick" in circumstances when a little reasoning on its part would convince it that the ruse is futile; as, for example, when a bird, having a nest in an aviary, behaves day after day as though its wings were broken after a human being has pushed it off the nest in order to examine the eggs, or young.

The down of the partridge nestling is of earthy brown hue with dark longitudinal stripes; thus the young bird assimilates closely to its surroundings. In other words, baby partridges, like the adults, are what is called protectively coloured.

The theory of protective coloration has fallen into some disrepute, because it has been carried to absurd lengths by some of the more ardent of its advocates. For example, Mr. Thayer asserts that the flamingo is coloured pink and white in order that the creatures which prey upon it shall mistake it for part of the sky at sunset! The truth is that, speaking generally, an animal, whether it preys on others or is preyed upon, derives benefit from being inconspicuous; nevertheless, as we have noticed in the case of the pheasant, some showy species are able to hold their own in the struggle for existence. Good eyesight and acute hearing are probably more valuable assets than protective colouring. No matter how closely an animal assimilates to the hues of its surroundings, the least movement reveals its presence to a vigilant foe. Instinct teaches a baby partridge to crouch when its parent utters a warning cluck, and to remain immobile so long as the clucking continues. This obedience to the warning call is not taught by the parent. The young bird, cheeping inside the egg, ceases to do so on hearing the call.

Much nonsense has been written about the education of nestlings by their parents. Natural history books contain accounts of parents teaching their young to fly and seek their food. Most of such accounts are based on imagination. Feeding, flying and, indeed, most actions of nestlings are instinctive and independent of parental instruction. Baby birds are born with a large equipment of useful instincts; all that is needed is the necessary stimulus to call each into play.

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The most important functions of avian parents are to feed and protect the young until they are able to fend for themselves. They assist in the education of their offspring by the example they unconsciously set. This matter is dealt with at some length in my *Birds at the Nest*.

Young partridges, although they run strongly and pick up food almost immediately after leaving the egg, cannot fly until they are about thirteen days old. As soon as their wings are developed they fly and avoid obstacles instinctively.

A French saw runs: *A la Saint Jean Perdreaux volant*. St. Jean's day is June 24th. If this saying was ever true, either the habits of partridges have changed or spring comes in later than formerly.

Nowadays very few young partridges in France fly before the first week of July. Of two hundred and seven broods observed by M. Bureau, only ten were able to take wing by June 24th. In England most of them are not even hatched by that date.

Very shortly after the young have emerged from the shell, the parent bird leads them off to seek food, and they never return to the nest. At night the family sleeps in some field, the parent birds covering the young with their wings. They also brood them to protect them from rain. Heavy rain is perhaps the greatest danger to which baby partridges are exposed. "Two days of heavy rain in the first week of July," writes Millais, "will destroy half the young partridges in England."

The following appeared in *The Times* on the 1st September, 1927: "This summer has been fatal. June is the month in which most of the partridges hatch off, and over the greater part of the country there was hardly a warm night during the month, while on several nights there was actually frost. The chief damage was done about the fourth week of June, when bitter cold followed heavy rain, and before the week was out most of the chicks which had been hatched were dead. There were still partridges hatching at the end of June and beginning of July, but then came a heavy storm on July 6th and finished off those also, and even some of the old birds with them. By the Eton and Harrow match, which is the traditional date on which partridge shooters meeting at Lord's compare notes,

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most of the notes were the same, and as dismal as they have been since what is generally regarded as the worst year on record, 1879."

This forecast proved true. Except in a few parts of the country where the rainfall in June and July was comparatively light, very few young partridges were reared. One bag of sixty birds included but two young. In most parts of the country four old birds were shot to one young. Nor was the disaster confined to the British Isles. Major M. Portal states (*Country Life*, Nov. 5th, 1927) that in France the shooting and eating of partridges was prohibited after November the 1st.

Rain, even when not so heavy as to drown baby partridges, or so incessant as to cause them to die of cold, is fatal to many by rendering the soil very sticky. The wet earth adheres to their legs and toes and causes them to lag behind; not being missed by their parents they are left to perish.

Birds are not arithmeticians; few of them are able to distinguish between one and more than one. Every bird photographer is aware of this. If he set up near a nest a "hide" from which to photograph a sitting bird, the latter, if it has seen him enter, is often afraid to return to the nest. If, however, the photographer is accompanied to the hide by a friend who alone walks away when the photographer is in the hide, the bird returns unconcernedly to the nest as soon as the friend is out of sight.

From this clogging of the feet by wet earth it follows that clay soil is unsuitable for partridges. Further, many young ones fall into the fissures that form in such soil in time of drought. From deep cracks they are unable to extricate themselves.

By the middle of August most young partridges are about three-quarters grown, and their down has been replaced by feathers. Until about Christmas their legs are stone-coloured instead of blue-grey. By this and the pointed tip of the first flight feather may they be distinguished from adults. If undisturbed the members of a covey keep together until the early spring.

of the British partridge is living in difficult times, and many sports-
Baby b. of opinion that it needs assistance if it is to retain its foot-
that is new country.

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Apart from the poacher and adverse climatic conditions, the bird suffers from the depredations of foxes, dogs, cats, stoats, polecats, sparrow-hawks and other birds of prey. The eggs are attacked by rats, hedgehogs, rooks, crows, magpies, and, it is said, jackdaws. Mr F W Frohawk suggests that the increase in the number of rooks of recent years has led to increased destruction of partridges' eggs. Most of the above attack the chicks, as does the little owl. Ogilvie once came upon a butcher bird's larder stocked with four or five baby partridges.

Both young and adults are subject to diseases. Among these mention may be made of gapes and coccidiosis (which may be communicated to the partridge by poultry), pneumonia and a wasting disease, which Dr Hammond Smith traced (*Field*, December 6th, 1913) to a parasite smaller than, but apparently akin to, the strongyle worm which works havoc among grouse. This malady, like grouse disease, periodically assumes epidemic form. Outbreaks occurred in the years 1913 and 1926.

Most old sportsmen assert that partridges are far less abundant in England than they were formerly.

This is not due to their being overshot, owing to the fact that, of recent years, driving has replaced to a considerable extent the time-honoured practice of walking them up.

"There can be no question," writes Ogilvie (*Field Observations on British Birds*, p. 63), "that the practice of driving birds over the gun, instead of walking them up, is very beneficial to the stock of birds that that ground will hold. It has been found over and over again that the introduction of driving has increased the average stock of birds two and even threefold. I may quote my own experience. In the days of walking up, our average bag lay between 400-500 brace. After a few years' driving the average rose to 1,000, and is now nearer 1,500. The reasons for this increase are many, but I would especially emphasise one of them. Single old birds, barren pairs, etc., are shot off. Even in the case of coveys, the parents are frequently the leaders and are the first birds to come to grief as they top the fence. The *alpha* and *omega* of partridge-raising is to have a large stock of young, and as few old birds left on the ground at

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the close of the shooting season as possible. This is exactly what driving tends to bring about, and is almost the converse of the walking-up method. In the latter, the old birds, barren pairs, and so on, are just the ones that least often offer the chance of a shot; while even in the case of coveys, it is the young birds rather than the parents that suffer most, and it is no uncommon thing to exterminate all the young birds in a covey in thick cover, such as seed clover, potting them one after another as they get up. Now this can never happen in driving. One covey may offer a chance to two guns, and they may both secure a brace, one or both the parents being most likely among the slain, and then passes out of the day's reckoning."

In 1926 *The Field*, with the object of testing the assertion that the partridge is diminishing in numbers in the British Isles, and of ascertaining the causes of any such diminution, instituted an enquiry and circulated a *questionnaire*. The replies received to the various questions were tabulated, and the most interesting of them published in the columns of *The Field* in 1926 and 1927, and later reprinted in book form under the title *Partridges, Yesterday and To-day*. This little volume should be in the hands of everyone interested in the partridge.

Most of those who expressed an opinion consider that the partridge has of late diminished in numbers in our country. A few do not admit this; they say that the pooriness of the bags of partridges obtained in 1926 and 1927 is due entirely to the wet summers of those years.

The opinion of the majority appears to be the right one. It is submitted a diminution in the number of partridges is the inevitable result of the large increase in the human population of these islands and the manner in which improved means of communication have caused it to spread.

The following factors inimical to the partridge are now operating in various parts of the country:

(1) The conversion of arable land into pasture, building-sites and golf-links, whereby the food supply of the partridge has been diminished.

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(2) The introduction of reaping and binding machines which leave practically no stubble

(3) The modern practice of ploughing immediately after reaping

(4) The increased number of poultry kept, and the practice of turning the fowls into the stubble, where they compete for food with the partridges and often communicate to them some of the diseases to which poultry are subject

(5) The increase in the number of pheasants reared These hatch out on an average about three weeks before the partridges and so secure the *pick of the food*

(6) The dressing of the fields with artificial manures which contain chemicals destructive of the insects on which partridges feed and possibly poisonous to young partridges Lord Ashburton points out (*Field*, 1926) the heavy crops that result from the use of such manures lie down flat in heavy rain, and the sodden mass they form must cause the death of many young birds

(7) The giving up, on account of its expense, of the practice of dressing the fields in some localities with lime or marl, which is said to result in the soil becoming sour and unsuitable to partridges

(8) The advent of the tarmac road, which has resulted in a great diminution of the supply of grit so essential to the birds Cases are on record of baby partridges sticking to the tar before it has dried

(9) The cutting down of hedges, and the modern methods of maintaining those permitted to remain, under which the hedges now afford far less cover to nesting partridges than they did formerly Moreover, as Lord Ashburton has remarked, the practice of trimming hedges in May and early June must tend to disturb nesting operations

(10) The increase of small holdings, of many of which the owners take no care of the partridges on them

(11) The increase in the number of cats, rats, dogs and rooks as the result of the growth of the human population

It is submitted that the above, taken in conjunction with recent wet summers, afford ample explanation of the poor bags of partridges obtained

Some insist that there is another cause of the diminution in the

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number of partridges, namely, that owing to in-breeding the British race has suffered loss of stamina. I can find no proof of this. Driving and the Euston system of rearing are recently-introduced practices which go a long way to check in-breeding. Moreover, since the beginning of the century the importation of partridges and eggs from Hungary and Germany has resulted in the infusion of some fresh blood into the British race.

Whether the latter has gained anything by the introduction of the Hungarian birds is open to doubt. The infusion of fresh blood is generally beneficial, but we must bear in mind that the British climate is unique in its variability. Our winter, although not severe, is trying to most organisms owing to the humidity of the atmosphere, and many creatures succumb to it. Our native partridges are the descendants of those who have survived because their constitutions are particularly adapted to it; all the partridges not so adapted have been killed off, chiefly by pneumonia. It is submitted that partridges bred in Hungary, no matter how fine their physique, are not likely to be so well adapted to the vagaries of our climate as birds of the local race. Thus the introduction of this new blood may have resulted in the British race of partridge becoming less well adapted to the local climatic conditions.

In comparatively few places does the introduction of the Hungarian partridge seem to have produced good results.

If it be a fact that the stamina of the British partridge needs strengthening, it might be possible to accomplish this by introducing the bearded partridge (*Perdix daurica*). This bird is imported in numbers in cold storage under the name of the Manchurian partridge.

It lives in a rigorous climate and must be a hardy bird, but from that it does not follow that it could withstand the kaleidoscopic changes in the climate of the British Isles. It is a small species, characterised by the feathers of the throat being long and pointed, a black horse-shoe on the breast and the buff extending below the throat. It might interbreed with our species. From the fact that it is smaller it does not follow that the hybrid resulting from the cross would be smaller. The cross between the British pheasant and the smaller Japanese species is not undersized.

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Whether or not there has been a falling off in the stamina of the British partridge it is evident that the bird is living in difficult times, and it behoves landholders to assist it in every way possible

This is being done on many estates. The Euston system of rearing the birds, that is, the substitution of dummy eggs for real ones and placing the latter under a domestic hen until they are nearly ready to hatch, if carried out intelligently, must be useful both by minimising the dangers to which the eggs are exposed during incubation, and by preventing close in-breeding

Other ways of helping the partridge are to sprinkle grain in winter along hedgerows where it is likely to elude the vigilant wood-pigeon, to provide partridges with clean drinking-water, to sprinkle their nests and dusting-places with insect powder in the vicinity of poultry farms. The last tends to prevent partridges being infected by poultry diseases and to keep down the lice which kill many baby partridges

Mr Wormald's *How to Increase a Stock of Partridges and New Ways with Partridges*, excellent little books published by *The Field*, should be consulted by those desirous of assisting the British partridge in its struggle for existence

CHAPTER VII

THE RED-LEGGED PARTRIDGE

IF a beauty competition, open to all British game birds, were held, the red-legged partridge (*Caccabis rufa*) would be well in the running for the first prize. His most formidable rivals would probably be the pheasant, the blackcock, and the mallard.

The beauty of this species is of the quiet type, that of the violet rather than the poppy. The colouring of its plumage, however, is less subdued than that of the common partridge: the grey, brown and russet hues are enlivened by the white throat and black gorget, and the legs and bill are bright red.

The crown of the head is red-brown, shading into grey on the forehead, the remainder of the upper plumage, including the wings, is greyish brown, washed with red on the outer tail feathers. The head is ornamented by a narrow white eyebrow. The chin and throat are white, encircled by a band of black, outside which is a narrow ring of black and white. This is followed by a broader one of brown, spotted with black, which meets the grey of the breast. The lower parts are rufous, the flanks being set off by a number of black, white and orange crescent-shaped markings.

Among the partridges finery is not confined to the males. A blunt spur on the leg of the cock is the only mark of distinction between the sexes of the red-legged species.

This, like the common partridge, occasionally produces sports or mutations. In one of these the parts of the plumage which are normally brown are reddish; in another they are pale grey. In some specimens the plumage exhibits much white; very rarely it is all white, like that of the ptarmigan in winter.

In addition to these there is a curious variety of red-legged partridge having the crown black, and the dark spots outside the band on the small chin and throat represented by a few black crescents. In

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this form the grey of the breast extends to these crescents, and the wings are mottled with buff

The red-legged partridge, like the pheasant, is not indigenous to the British Isles. When first introduced in the time of Charles II, it failed to establish itself as a wild bird. About the year 1774 another, and this time successful, attempt was made to acclimate it. The Marquess of Hertford imported several thousand eggs, had these hatched by fowls, and liberated the young, when well grown, in Suffolk on light sandy soil, which suited them, in consequence they thrived and multiplied. A few years later either Lord Rendlesham or Lord Rochford (the evidence is conflicting) introduced some of the birds on to his estate. From those centres the species has gradually spread, and, as many other landholders have subsequently imported it, it is now thoroughly established in the British Isles, but it does well only where the soil is sandy. A clay surface appears to be even more fatal to its young than to baby grey partridges. Many sportsmen are of opinion that the red-legged is more hardy and less liable to disease than the grey partridge. This may be so, on the other hand, being far less common in the British Isles it would seem to run less risk of infection by contagious diseases or suffering from shortage of food.

The natural habitat of the red-legged species is South-Western Europe. As it was introduced into England from France, it is often called the French partridge. Another name by which it was formerly known is the Guernsey partridge. Why it was so termed is not apparent, as it is not indigenous to that island.

Red-legged partridges are not confined to Western Europe. They occur in Eastern Europe, Western Asia and Northern Africa, but, as the partridges found in those regions differ in appearance from the French partridges, they are considered to constitute different species.

The red-legged partridge, then, like the pheasant, is split up into a number of species, each of which occupies its own area. The red-legged partridges of Spain and Portugal are more richly coloured than those of France, in consequence some naturalists consider them a different species and call them the Spanish partridge.

(*Caccabis hispanica*). Others regard these merely as a local race or sub-species (*Caccabis rufa hispanica*); such designate the French form *Caccabis rufa rufa*. The other species of red-legged partridges are the Barbary (*C. petrosa*) found in North Africa; the rock partridge (*C. saxatilis*) which inhabits the mountains of the continent of Europe; Przevalsky's partridge (*C. magna*) found in Tibet; the black-headed partridge (*C. melanocephala*) which occurs in Arabia, and the chukor (*C. chucar*) of Eastern Europe and the Himalayas. The last is the bird that affords excellent sport in the Himalayas.

From the above it will be apparent that red-legged partridges exist both on plains and mountains, but they seem to prefer hilly to level localities. The "red-leg" is very fleet of foot, and; when walked-up in flat country, trusts to its legs rather than its wings for safety; for this reason it has acquired an evil reputation in England. It is more wary than the common partridge, and runs away at the first sound of any heavy-footed creature. The common partridge, on the other hand, crouches when alarmed and remains thus until its foe is close up, when it takes to its wings and offers a comparatively easy shot to the sportsman.

The red-leg is not only more wary than its cousin, but seems to give out a stronger scent; in consequence the sporting dog scents it from afar, but probably not before the partridge has heard the footfall of the dog's master; then, while the dog cautiously and slowly moves in the direction of the bird, the latter walks briskly away and so increases the distance between it and the dog, until, meeting some obstacle through which it cannot walk, it takes to its wings, well out of range, to the disgust of both dog and sportsman. In these circumstances the latter often becomes vocal, calls the bird names, compares it unfavourably with its cousin. Some have even gone so far as to assert that it teaches the latter its evil ways! This, as Euclid would say, is absurd; but there is no knowing what an angry man will say. An old colonel of my acquaintance maintained that the crows in India used, out of "cussedness," to change the labels he inserted in cleft sticks to denote the kind of seed he had sown in various flower beds! Another groundless charge against the red-leg is that it often drives the common partridge from a locality.

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As the birds eat the same kind of food, there is competition between them, and they sometimes fight; but those who have witnessed such combats report that the common partridge has been victorious.

Although no mean sprinter, there is a limit to the distance a red-leg will run, even when it encounters no obstacle. Usually, after it has travelled about five hundred yards on foot, it crouches until its pursuer is close up and then takes wing. Thus in places where there are no hedges the red-legged partridge affords good shooting when walked-up. In hilly country the bird keeps to the hillsides and, when flushed, almost invariably flies across the valley to the hill on the opposite side. I know of no sport more exhausting than chukor shooting in the Himalayas. One often has to descend five or six hundred feet and ascend the same distance in pursuit of a covey. The best way to circumvent the red-legged partridge in hilly country is for the gunners to form two parties, one repairing to the hill on the right of the valley and the other to that on the left. The parties should advance simultaneously, so that the birds put up, but not brought down, by one party, fly across the valley and alight near the other.

The only satisfactory method of shooting red-legs in flat country, where the fields are separated by hedges, is to drive the birds to the guns. When driven they afford better sport than the common partridge, because the covey does not as a rule rise *en bloc*, but first one bird, then another gets up, and each individual takes an independent line of flight.

Apart from this addiction to running, the habits of the red-leg are very like those of the grey partridge, and what has been written of the latter applies to the former.

Their calls, however, are very distinct. That of the grey partridge is difficult to syllabise. Ogilvie describes it as "a kind of crake, *chis-ick*, repeated over and over again," and likens it to the sound made by a door swinging on rusty hinges. The call of the French partridge may be rendered *chuck, chuck, chuck-or*.

The red-leg feeds on young shoots and leaves, grass, seeds and insects. Like the grey bird, it is fond of a dust bath.

It is usually said that the red-leg differs from the common

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partridge in that it perches in trees. It occasionally settles on a gate or fence or wall, particularly when the ground is very dewy; but only on rare occasions does it fly into trees. It neither roosts in them nor takes refuge in them when flushed.

During the autumn and early winter the French partridge, like its grey cousin, goes about in coveys. These usually break up in January or February, when the birds pair.

The nest resembles that of the common partridge and is placed in similar situations; indeed, a nest is sometimes shared by the two species. Not uncommonly nests are made near human habitations. Mr. R. Kearton has published in his volume, *Wild Nature's Ways*, a photograph of a red-legged partridge sitting on her nest in a flower-pot which had been thrown upside down into a kitchen garden surrounded by flint walls. A piece had been broken out of the pot leaving a gap which served as an entrance for the nesting bird. Occasionally the nest is placed well above the ground: on top of a haystack, a thatched shed or a pollard tree.

The eggs are laid about the same time as those of the common partridge. The date of laying appears to be affected by climatic conditions. Dr. Louis Bureau, who has made a special study of this species in France, states (*L'Age des Perdrix*) that eggs are laid earlier south of the Loire than north of it. In the north he has never found an egg earlier than May 12th, while in the south April 21st is the earliest date. F. M. Ogilvie records finding in Suffolk four eggs on April 15th, 1893, which indicates that the first egg of the clutch was laid about April 9th. In France the majority of red-legged partridges do not lay before May 20th, which is considerably later than in England. Thus the habits of the species differ slightly in the two countries. In France the clutch appears to be smaller. Bureau gives twelve as the average number; he puts the maximum at seventeen. In England eighteen is not an unusual number, and Ogilvie considers fifteen to be the average. The Rev. J. C. Atkinson stated in 1862 that the number of eggs in the clutch varies from ten to fifteen or sixteen. From this it would appear that the species is becoming increasingly prolific in England.

The average interval between the laying of successive eggs is

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about forty-eight hours. According to Bureau, the hen, when her first clutch is destroyed, begins in seven days' time to lay a second, which contains two eggs less than the first. Third layings are rare in France.

The eggs are cream-coloured, heavily speckled, spotted and blotched with reddish or cinnamon brown. They are larger than those of the common species, and are very hard shelled. Unlike her English cousin, the red-leg does not keep the eggs covered between the intervals of laying them. Occasionally two birds lay in the same nest, in consequence nests of more than twenty eggs are sometimes found.

The hen alone incubates. The male usually takes little interest in her after she has laid the eggs. He seems usually to consort with other males, but there are cases on record of the male not only being in attendance but even sharing in incubation. Indeed, Aristotle stated that the hen chukor (an eastern race) lays her eggs in two nests, on one of which the male sits, and that he rears the young hatched by him.

The period of incubation is shorter by about a day than that of the grey partridge. In England it is about twenty-three days.

Bureau, in France, found that, where the last egg of a clutch of sixteen was laid on June 5th, all the young emerged from the eggs during the night of the 28th-29th June, making the period of incubation between twenty-three and twenty-four days. He states that according to his experience the eggs take twenty-five days to hatch under a domestic fowl.

The wariness of the red-legged partridge is probably due to lack of courage. The hen is far more prone to desert her eggs than is her cousin. When danger threatens her young she takes to her heels or wings and leaves them to their fate.

Birds are creatures of instinct. Perhaps their two strongest instincts are that of self-preservation and the parental instinct. When these, so to speak, clash—that is to say, when one of them prompts the bird to escape and the other to stand by her young—the instinct that happens to be the stronger at the particular moment governs the actions of the bird. The more timid the individual the greater is the stimulus of danger.

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The timidity of the mother bird is not the only disadvantage at which the red-legged nestling is placed as compared with its grey cousin.

As the French partridge is more addicted to running than the English bird, the mother often wanders long distances with her brood, and some of these perish because they fall out through weariness. As we shall see, the wild duck loses many of her nestlings by swimming too far with them.

As in the case of the common species, many young red-legs succumb in wet weather owing to their feet becoming clogged with mud.

Young red-legs are covered with down when hatched, and are able to walk and pick up food shortly after they emerge from the egg. Although the adult red-legged partridge is more brightly coloured than the common species, the reverse is the case with the nestlings. The red-legged chicks are distinguished from the others in that the three longitudinal bands on the back are whitish instead of black, the back is mottled with black instead of buff, and there are no black spots on the sides of the head.

Excellent coloured plates are to be found in *The Gun at Home and Abroad*, depicting adult and nestling red-legged and common partridges, and the grey and red varieties of the adults.

As regards the French saying that young partridges fly on June 24th, Bureau found in France that only five out of 197 broods were able to fly by that date. His figures for the common species are ten out of 207 broods.

The first feathering, which is barred, is retained only a few weeks; being replaced by the adult plumage in the autumn after the young bird is hatched. The researches of Bureau (*L'Age des Perdrix*) show that this moult takes 130 days, as compared with 119 days in the case of the common partridge. The first feather to be shed is always the tenth flight feather from the outside; when this has been replaced by a new one, the ninth feather is shed, and so the process continues in an orderly manner.

The first flight feather is not shed at the first autumnal moult. As, instead of being rounded, it is pointed like a lancet and there is

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a yellowish white patch near the tip, it serves to differentiate a bird of the year from an older one.

During transition from the barred to the adult plumage, the red-legged partridge has a curious appearance, and, in consequence, sometimes it is mistaken for a hybrid with the common species.

As we have noticed, partridge hybrids are exceedingly rare, if they occur at all. The two species show no inclination to mate with each other.

CHAPTER VIII

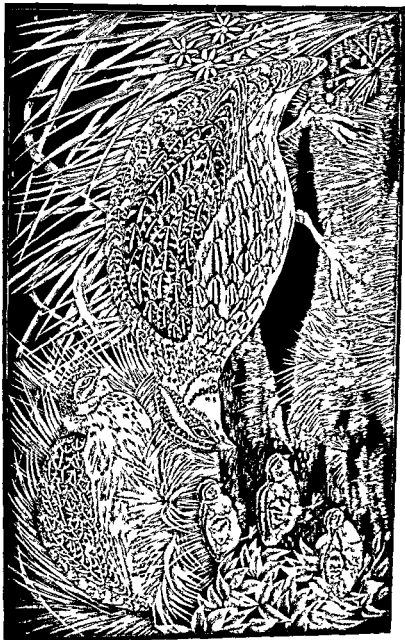
THE QUAIL

THE quail (*Coturnix communis*) is a miniature partridge. The plumage in both sexes is mottled brown. Like that of most game birds, the pattern is very complicated. Scarcely any two feathers are exactly alike. The crown is black with reddish brown or buff cross-bars. Along it run three bands of creamy hue, one on the summit and one over each eye. The feathers of the back are reddish brown, each having a cream-coloured streak, more or less surrounded by black. The tail, which is very short, is composed of soft feathers coloured like those of the back. The flight feathers are brown with cream mottling on the outer webs. The throat of the male is of a pale cream hue with a dull black anchor-shaped marking. The remainder of the lower plumage is fawn-coloured in the male, darkest on the flanks, which are spotted with dark brown and streaked with cream. The female has a whitish throat and her breast is spotted with black; she is a little larger than the male. The average length is about seven and a half inches and the weight from three to four ounces. The wing is a little over four inches in length, and thus, in comparison with the size of the body, is bigger than that of the partridge.

As the quail is a migrant, long wings are a necessary part of its equipment.

The range of the quail extends over the greater part of Europe, Asia and Africa. As in the case of nearly all the other migrants of the northern hemisphere, it breeds in the colder part of its range and winters in the warmer. In summer it is found as far north as lat. 65° N; in the autumn it migrates to Africa and South Asia.

Quail migrate by night in enormous flocks. Those that travel a greater distance that can be covered in a night rest in great masses during the day, often covering acres of ground. Perhaps the earliest



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record extant of the migration of these birds occurs in the Bible. In the sixteenth chapter of Exodus we read "And it came to pass that at even the quails came up and covered the camp" And again in the eleventh chapter of Numbers "And there went forth a wind from the Lord, and brought quails from the sea, and let them fall by the camp, as it were a day's journey on this side and as it were a day's journey on the other side, and as it were two cubits high upon the face of the earth And the people stood up all that day, and all that night, and all the next day, and they gathered the quails he that gathered least gathered ten homers and they spread them all abroad for themselves round about the camp"

The birds must have been carried out of their course by an adverse wind, and have alighted in an exhausted state as they often do on ships

Some naturalists have gone out of their way to raise difficulties by suggesting that the birds in question were not quail but sandgrouse. There is no justification whatever for this. The Israelites must have become familiar with the quail during their sojourn in Egypt, moreover, as sandgrouse have great powers of endurance, it is improbable that such numbers of them alighted dead-beat in one place

The capacity of the "homer" is not known. Estimates have put it at various figures from forty eight to eighty gallons. Mr H S Gladstone calculates (*Shooting Bags and Shooting Records*, p 60) that the children of Israel must have killed upwards of nine million quail in thirty-six hours. Small wonder that the resulting surfeit of flesh brought on an epidemic

Pliny writes of quail "They alight in such numbers on ships (always at night), settling on the masts, sails, etc, as to bear down barques and small vessels and finally sink them, and on that account the sailors have a great dread of them when they approach near to land' Such may well have been the fate of a heavily laden, undecked vessel manned by a small crew, the desperate birds may have alighted in numbers too great for the sailors to cope with. To-day birds in dense flocks are a danger to aeroplanes

Quail are far less numerous than they were when the Israelites were wandering in the desert, nevertheless they still migrate in

prodigious numbers. On the shores of the Mediterranean they sometimes cover the ground for miles. It is said that they used to appear in such abundance on the island of Capri as to constitute the principal source of revenue of the bishops of Naples.

Even as the Israelites of old greedily collected migrating quail, so to-day do the inhabitants of the countries in which they tarry on their journey. Their arrival every spring and autumn is very regular, the date varying only by a day or two from year to year; hence the people know when to expect them. Their coming causes the greatest excitement. Crowds gather to witness the sight or to capture the birds.

Although quail are less plentiful in the East, hundreds of thousands visit India. Hume describes how, as he stood on the summit of a Himalayan mountain one moonlit night in April, he witnessed, flying close overhead, a cloud of migrating quail many hundreds of yards in length and, he supposes, fifty in breadth.

After reaching India the quail disperse and spread over the whole of the country. During the winter months big bags of quail are seldom made, but a few are shot by those out after partridges or snipe. A few days in autumn and spring constitute the quail-shooting season. During the period of the autumn migration the sportsman has call-birds placed in a small millet field near his residence. The calls of these usually induce numbers of the migrating birds to settle in the field. At dawn a gun is stationed at each end of one side of the field and a rope is dragged over the millet towards them. The moving rope causes the quail to take alarm and fly out. By this method a bag of ten couple may be obtained in less than half an hour.

In the spring the quail live in the fields of ripe corn. These are cut earliest in the southern parts of the country. As these are harvested the quail move northwards, following the harvest. After the greater part of the crop has been cut in any locality the quail which happen to be tarrying there afford excellent sport for two or three days. This is particularly the case in the Himalayas and Kashmir. In the latter hundreds of quail sometimes collect in one small patch of corn.

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Large numbers of the birds are netted in India, especially in spring. Many of the birds so caught are kept in quaileries to be eaten during the hot weather.

The British Isles are within the breeding range of the quail. Those that come to our shores arrive in May and depart in October.

This gallant little game bird used to be far more abundant in the United Kingdom than it now is. Gilbert White wrote in 1768 "Quails crowd to our southern coast, and are often killed in numbers by people that go there on purpose." He states that there were but few quails at Selborne because they "more affect open fields than enclosures."

Formerly the Isle of Thanet was famous for its quails, and people used to assemble there from afar to shoot them.

As recently as 1887, Robert Blakey wrote (*Shooting*, p. 83) "Quail shooting is chiefly confined in Britain to some sections of it to the counties of Essex, Kent, Cambridgeshire, Suffolk and Norfolk."

These are all things of the past. Nowadays the discovery of a quail's nest in England is a noteworthy event. It is not improbable that quail may cease to visit England. In some years very few, if any, come to our shores.

There were considerable influxes of quail in 1870, 1885, 1899, 1913 and 1917. Were these unusually large inflows due to the erratic habits of the quail? I think not.

The great majority of migrants are very regular in their movements, their arrivals and departures take place about the same dates every year, moreover, many individuals return annually to the same locality to nest. By ringing swifts it has been proved that the same nest is sometimes used year after year by the identical birds.

A few species, however, are very erratic in their migratory movements. The rose coloured starling (*Pastor roseus*), of which a few individuals occasionally visit us in the spring, is a striking example of an erratic migrant. It spends about nine months of the year in India, and, in the spring, makes a dash westward to its nesting quarters. Apparently these may be almost anywhere between Italy

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on the west and Palestine on the east. One year the birds come in hundreds of thousands to nest round about Smyrna, in the next they may breed in the Crimea, in the following in Italy, after that in Bulgaria. All one can say of the species is that apparently it never breeds two consecutive years in the same locality.

It is obliged to nest where locusts are swarming, as the nestlings are fed on young locusts. If the insects were the first to reach the nesting locality, we should think that the starlings discovered their whereabouts and migrated thither; but the starlings arrive *before* the locusts. We are unable to explain how it is that the rosy starling invariably nests in localities where locusts will swarm. If the truth must be told we are almost equally in the dark regarding the causes of migration in general. There has been a great deal of theorising on the subject; numbers of hypotheses have been put forth, none of which is satisfactory. Nature is full of mysteries, and one of the greatest of these is the phenomenon of bird migration.

Other erratic migrants are the nutcracker, the waxwing, the shorelark and Pallas's sandgrouse, all of which have visited England on occasions.

"The nutcracker," writes Mr. F. W. Headley (*The Structure and Life of Birds*, p. 376), "is fond of pine forests, nests in Scandinavia, in the Black Forest and the Alps, and is not as a rule given to wandering. The waxwing breeds in Arctic regions, and has a way of suddenly, for unknown reasons, forsaking a favourite breeding ground and moving to another district. Five times during this (nineteenth) century, in winter time, it has appeared in Britain in considerable numbers. The shorelark's summer home is in Northern Scandinavia, Russia and Siberia. In its irregular migrations it sometimes visits our east coast. Pallas's sandgrouse lives in summer between the Caspian and Lake Baikal, in winter moves to Northern China, and there has been much speculation as to what caused large hordes to sweep westward in 1863 and 1888. The onward roll of the living wave from place to place on the Continent, till at last it reached England, excited the curiosity of people for whom, as a rule, the doings of birds have no interest. But in the absence of any facts to help us to explain these weird phenomena, it is well to let

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the reader's reason or fancy have free play without attempting to guide him " .

There seems, no need to invoke erratic migration to explain the occasional large influxes of quail into the British Isles. As we have already noticed, the migratory movements of the quail are remarkably regular. The reason why they do not come in large numbers to our country every year is, I believe, simply that there are not birds to come .

The British Isles form the extreme western limit of the migration of the quail. The movement, as we have noticed, takes place in a more or less leisurely fashion. The birds in the course of their journey alight and tarry where they find abundant food. When a quail has reached its breeding area, it is likely to spend the summer at the spot at which it happens to alight, provided all the nesting areas in the locality are not already occupied by birds who fight trespassers. As we shall notice, the quail is a valiant fighter, a pocket warrior. When a bird seeking a nesting area finds no territory available where it has settled it moves on until it comes upon a vacant site.

It is my belief that, owing to the depredations made on the quail population by human bird catchers on the migratory route, the species has of late years greatly diminished in numbers, so that ordinarily there are now on the continent of Europe sufficient nesting sites to meet the requirements of practically all the birds that breed in the west. In consequence few find it necessary to visit the British Isles. It is only in exceptional years, when the quail population is unusually large, that there is a considerable influx of the birds into the United Kingdom.

The eggs and young of quail are subject to all the dangers which beset those of ground-nesting birds. Even as there are good years for partridges and grouse, so are there good seasons for quail, probably those when rainfall is scanty. In a good year far more young are reared than in a bad or a normal one, and when this happens there is a greater demand for nesting sites in the following season, and many quail come to Great Britain in search of them.

It may be asked, in view of the fact that quail have been netted

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in millions by man ever since the children of Israel spent forty years wandering in the desert; how is it that the diminution in their numbers has shown itself only recently?

The answer is that quail are captured for human consumption; the number caught depends on the demand for the birds. Before the days of the steam engine it was not practicable for those who captured quail to despatch them to a great distance; transport was slow and expensive. To-day, owing to steamships and railways, quail are sent from Italy to England. A century ago the cost of transmitting quail so great a distance and feeding them *en route* would have made their price prohibitive. Nowadays they are transported by rail in flat boxes. As many as ten thousand can be sent in a wagon. Thus the number of quail captured for the market is undoubtedly greater than it was before the days of steam communication.

Col. R. Meinertz states (*Ibis*, 1920, p. 930) that three million are exported annually from Egypt. Mr. R. E. Moreau writes (*Ibis*, 1927, p. 450): "Quail land all along the Sinai coast in such numbers that statistics of those netted and exported to Egypt by camel-load run into millions each year."

The result of all this netting is that quail, although prolific, cannot make good the whole of the loss, and have become scarce in both the British Isles and France, and the numbers that cross the Mediterranean on migration have diminished considerably. It is said that, whereas a century ago 150,000 used to be captured at Capri in a season, in 1897 the number fell to about 56,000, and in 1904 to 30,000 or 40,000.

Probably considerable influxes of quail into this country will occur at intervals in future, but it may be doubted whether any of them will equal some of those of the past.

It is unlikely that the common quail will become extinct on the Continent because, quite apart from the fact that the Italian Government has taken steps to check the slaughter of the birds during migration, as soon as the numbers passing through any locality become small, netting ceases to be profitable.

Formerly some quail seem to have resided permanently in

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England There may have been a race resident in the British Isles which has become extinct in consequence of the increase of the human population, or the birds formerly seen in England during the winter may have been birds slightly wounded by sportsmen and so rendered unable to migrate when the time came Since quail have ceased to come to England in large numbers, there has been comparatively little shooting of them, hence few birds are pricked

• It is said that there are two races of the common quail in Spain—the migratory and the non migratory Thus Dresser writes (*Birds of Europe*, vol vii) "The Andalusian cazadores profess to recognise two kinds of quail—those which are migratory and called 'criollas,' and those which are resident and so named 'castellanas' There is certainly much difference in the colour of the plumage and of the legs, the criollas being lighter-coloured and slightly smaller birds than the castellanas, which are very dark Otherwise in habits, note, and eggs there is no difference, although at a glance the resident and migratory races can be easily distinguished "

Resident races are apt to arise in migratory species, and the former often have darker plumage, but there is some evidence that seems to indicate that the dark race of quail is not really resident Mr W C Tait writes (*The Birds of Portugal*, p 227) "The common quail arrives from the south in great numbers during March and April, many leave in September These are the larger and lighter coloured quail A smaller and darker coloured variety arrives in November and December in smaller numbers, a few of these are met with among the rushes on the sides of the Aveiro lagoon through the winter up till February " It may be that the dark-plumaged quail are those which breed in the north and winter in the Iberian Peninsula, while those that nest in Spain go south in autumn Although in many migratory species the individuals that nest farthest north often winter farthest south, this may not be the case with the quail

Whether or not these dark plumaged quail reside permanently in Spain is of practical interest to Englishmen, because if they do, and they are a hardy race, it might be possible to introduce them into the British Isles Attempts to naturalise a migratory species

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are likely to fail, unless very large numbers are imported and many induced to breed, because the casualties among birds during migration are so numerous that, even if instinct led those born in England to return in the following spring, it is doubtful whether sufficient would survive to carry on the race. Large numbers of quail perish at sea. Mons. Pellicot writes: "Being at a small town on the coast, I saw some boats come in containing ten or a dozen sharks. They were all opened before me and there was not one which had not from eight to ten quails in its body."

Quail often alight on ships in a state of exhaustion. Mr. E. C. Stuart Baker records (*Journal of the Bombay Natural History Society* vol. xxix, p. 584) that one morning in October at least two hundred quail alighted on the steamer on which he was travelling: they "just dropped on to the deck so exhausted that they allowed themselves to be picked up." Had those birds not chanced to meet the ship they would have been drowned. Col. C. Newton-Davies, I.M.S., states (*Field*, December 22nd, 1927) that on October 19th, 1927, he saw two quail fly towards the steamer carrying him, which was 750 miles from Bombay and 1,900 from Persia. They came from the north: there was a light N.W. breeze at the time. One quail reached the ship dead-beat, the other fell into the sea within a few yards of the ship and was drowned.

There are two non-migratory races of the common quail—the Cape and the Japanese. These have the throat reddish brown. Some regard them as distinct species. Such call the Cape quail, which is found in South Africa, Madagascar, Madeira, the Canaries and the Cape Verde Islands, *Coturnix capensis*, and the Japanese form, which occurs in Japan, South-East Mongolia and China, *Coturnix japonica*. Others, regarding them merely as local races, or subspecies, designate them respectively *Coturnix communis capensis* and *C. c. japonica*. These interbreed freely with the common quail. As the Japanese species lives in countries where the winter is cold, it might be possible to introduce it into this country and thereby restore the pastime of quail-shooting.

The Cape quail, like the Californian species, would probably be unable to withstand the vagaries of the British climate in winter.

THE QUAIL

Quail are largely nocturnal in their habits. They feed in the night and the early morning and evening, and sleep during the middle of the day. It was, I believe, Temminck who stated that they roost lying on their sides with the legs extended. This statement has been repeated by many naturalists. I omitted to verify it when I had the opportunity. Mr. F. Finn informs me that a quail he kept in his rooms at Oxford always squatted in the usual way. It slept during the day and was active at night.

The diet of the quail comprises grain of all sorts, from the seeds of grass and chickweed to peas, insects of many descriptions and slugs. A patient observer counted 3,500 seeds of chickweed in the crop of a single bird.

The males, although devoid of spurs, fight after the manner of gamecocks. For centuries quail have been kept as fighting birds by the devotees of the ring. The Greeks and Romans used to keep them for this purpose, and champions were greatly prized. It is said that Augustus put to death a prefect of Egypt for serving up to table a conqueror. Henry III of Castile was a great fancier. The Italians used to have gardens specially laid out for the purpose of trapping quails.

Quail fights are a most popular form of sport among Easterns from Afghanistan to China. Burnes tells us (*Travels in Bokhara*) that in Bokhara "almost every boy in the street may be seen with a quail in his hand, and crowds assemble in all parts of the city to witness these game battles." The birds are induced to fight for grain sprinkled between them. General Mundy states that when Lord Combermere, Commander-in-Chief in India, visited the King of Oudh in 1827, he was shown some wild beast fights, after he had witnessed these breakfast was provided at the royal palace. At the end of the repast the tablecloth was removed and quails, trained for the purpose, were placed upon the green cloth, these fought most gamely after the manner of the English cockpit.

"Quail fighting," he writes, "is an amusement much in fashion among the natives of rank, and they bet large sums on their birds, as they lounge luxuriously round, smoking their hukkas."

The dynasty of the Kings of Oudh has vanished, but quail-

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fighting remains and is still popular. Lockwood Kipling states that as much as 150 rupees (£10) is paid for a good bird.

In India quails kept for fighting are not provided with artificial spurs, but, in order to impart "Dutch courage," their masters, who chew beetle-nut, which colours the saliva red, rub them over with some of this. These red quail have a bizarre appearance. The Chinese are said to bathe their fighting quail in hot tea!

Those who fatten up quail for the table in quaileries usually keep the birds in darkness; they say that if this be not done the males fight and kill one another. This is not my experience. In India we used to keep them in a small house under a shady tree. The only casualties among our birds were from cobras and the birds killing themselves by striking their heads against the upper frame of the door opening to their run. Like all game birds, quail rise from the ground almost vertically preparatory to flight. Presumably this is necessary to enable them to clear the cover with which they are often surrounded when flushed. When transporting them it is necessary to convey them in very low cages to prevent them springing up and hurting their heads.

The quail is more vocal than most game birds. At the breeding season its cheerful call is often heard. This may be rendered by the words *wet my feet*, or *bit by bit*. It is responsible for one of the scientific names of the species—*dactylisornis*. The trisyllabic call is said to be preceded by a very soft note, sounding like *terra, terra*. The female, at the breeding season, calls *terra, terra*, followed by *pupu*.

Those who net the birds sometimes attract the males by imitating the notes of the female. This is done by means of an instrument known as a quail-pipe. The call is not unmusical and is greatly liked by some people. Bechstein states that in Germany the bird is caged for the sake of its "song." He says that, when calling, it stretches its neck, cocks its head on one side and shuts its eyes. It will not call in the daytime unless it is kept in a darkened room or cage, but it will often "sing" during the greater part of the night. When flushed it emits low notes which Dresser describes as *tril reck, reck, reck*.

The quail, despite its powerful wings, never flies far when dis-

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turbed. Rising a few feet in front of the sportsman, it just tops the crop when on the wing, moving the pinions rapidly and never gliding on motionless wings as a partridge does. During migration it flies only a few feet above the ground. In the Himalayas migrating birds are sometimes knocked down by sticks as they pass over a ridge. They often collide with telegraph wires. Tait records that in Portugal nine quail were caught in the office of one friend of his and three in that of another.

The quail never perches in trees or bushes. Its breeding area is very extensive. Its nest has been found as far north as lat 65°N. It breeds fairly regularly in the Faroe Islands. It nests in all parts of Europe, in Egypt, the Azores, the Canaries, Madeira, and in most parts of northern Asia. It does not ordinarily nest in India. The quail occasionally found breeding there may have been wounded birds unable to migrate. In seasons when the crops in the north-west of India are late in ripening, it may be that some quail tarry to feast on them until they are overtaken by the laying season.

Some naturalists allege the quail to be polygamous, others say it is monogamous. In fact it seems to be what Mr D. Seth-Smith describes (*Avicultural Magazine*, November 1906, p. 24) as "semi polygamous," that is to say, "although a male will pair with only one female at a time and remain true to her until incubation commences, he will promptly leave her when this period arrives and seek another mate."

If a pair be kept in an enclosure containing no other hen, it is desirable to remove the cock as soon as the eggs are laid, otherwise he may bully his wife and drive her off the eggs or break them. In Mr H. Willford's aviary a nest was made amid the growth of a grass covered bank. After the cock had broken two of the eight eggs, the remainder were put under a bantam. The hen quail then laid seven more eggs. Whereupon the cock was removed. The hen brought off a brood of six, one chick having died after a heavy shower. As in the case of most birds, the hen quail, if she lose her first clutch, lays another. In the warmer parts of the breeding range the quail is said to rear two, or even three broods in the season. It is a hollow scratched under the shelter of a tuft of grass,

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or in a grain field. It is sparsely lined with a few grass bents or stems.

The number of eggs in the clutch has been greatly exaggerated. Thus Mr. R. Blakey writes (*Shooting*, p. 83): "The quail lays more eggs in some countries than in others. In Italy and France, from fifteen to twenty is the average number; but in the hotter sections of the Asiatic and African continents, twenty-five and thirty are sometimes found in one nest."

In point of fact the number of eggs found in a clutch very rarely exceeds twelve, and is often as few as six.

The eggs, which are about an inch long, display great variation. The shell is usually of a faint cream colour, mottled and clouded, sometimes with umber, at others with reddish brown.

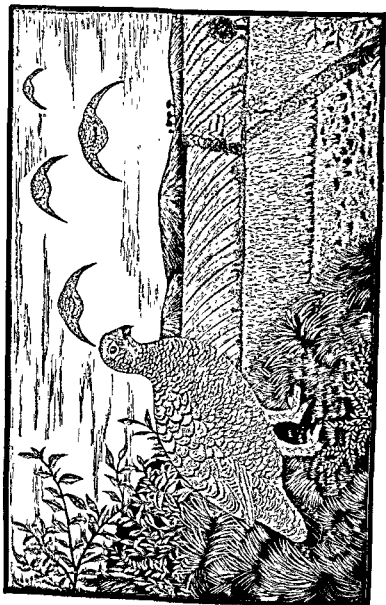
Incubation is said to occupy twenty-one days. The laying season is from May to July. The hen sits very close and will sometimes permit herself to be stroked while incubating. When frightened off her eggs she runs in preference to flying.

Quail, like other game birds, emerge from the egg covered with down and able to walk and pick up food. The mother alone tends the young. They require insect food and are very partial to ants' eggs.

Mr. D. Seth-Smith gives (*loc. cit.*) detailed instructions for the management and rearing of quails in captivity. They begin to eat seed when they are a week old, become full grown in about a month. They remain for some time with the mother. The little family is usually spoken of as a bevy of quail.

In England and Scotland quail shooting is permitted from August 1st to March 1st, while in Ireland the period, with greater propriety, is from September 20th to January 10th.

In conclusion, mention must be made of a quail which has been shot, I believe, three times in England—the Andalusian hemipode or bush-quail (*Turnix sylvatica*). This belongs to a very peculiar family. Its members have no hind toe, merely the three front ones. In them the sexes are, so to speak, reversed. The hen is larger and more showily attired than the male. She wanders about and fights other females, while the male incubates the eggs and tends the young brood.



CHAPTER IX

THE GROUSE

THE grouse is of even greater value to Scotland than the pheasant to England. "The bonnie brown bird" has doubtless preserved many a laird from ruin. Small wonder then that some enthusiasts speak of the grouse as a saint to whom the 12th of August is dedicated!

Some idea of its value may be gathered from the fact that the Committee of Enquiry into Grouse Disease estimated the annual income from grouse shootings in Great Britain to be over £2 000 000.

Unlike the pheasant, the grouse is indigenous, indeed, to use the words of Mr W J Gordon, it is "the only real and original British Bird."

It is the one and only species that renders a visit to the British Isles necessary to all who would see it in its native habitat.

Formerly it was considered to belong to the same genus as the black grouse and the capercaillie, and was called *Tetrao scoticus*, it is now deemed, together with its allies, the willow grouse and the ptarmigan, to constitute a separate genus in consequence its name has been changed to *Lagopus scoticus*.

It is often styled the red grouse to distinguish it from the black grouse or blackcock. Locally it is known as the Moor, or Muir Cock or Game, also as Red Game. An obsolete name is Gor Cock.

How it has come to be styled the grouse has not been satisfactorily explained. In the Poaching Prevention Act of 1862 it is termed Heath or Moor Game. It is designated Moorfowl in Montagu's *Ornithological Dictionary*, which, however, contains the entries "Grouse (*Tetrao*, Linnæus)—a genus of birds," and "Heathfowl, another name for Moorfowl."

Cuvier speaks of the *Poule de Marais grouse*, meaning probably the female black grouse, usually called the grey hen. *Grouse* appears

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to be a form of *Gris*, grey. It would seem that the adjective denoting greyness has thus been transferred incorrectly to the red grouse.

The description of the plumage of the grouse is a task from which most naturalists shrink, because the colouring and markings are of a complicated pattern and display great variation. There may be said to be several types of plumage. The males exhibit at least three: the red, the black and the brown; while the commonest of the female types are red, black and yellow. Nevertheless the species is rightly described as the red grouse, as even the black forms look very dark rich red when seen among the heather.

I have now before me a brace of grouse shot in Argyllshire, of the black type. In these the crown is equally barred with black and buff, but on the cheeks and chin the buff predominates. The remainder of the upper plumage, except the wing feathers, is black with rich buff spots. The breast is chestnut with black bars. The abdomen is brown and buff, many of the feathers being tipped with white. The tail is black, with a few buff cross-bars on the four median feathers. Above the eye is a patch of scarlet skin. The legs and toes are completely covered with fine whitish feathers, which look like fur, hence the scientific name *Lagopus*, hare-footed.

The flight-feathers are brownish-black above and glistening silver grey below. The outer web of the first six flight feathers is very small and is partly white in some of them. The feather shafts are shiny. The light reflected from these and from the silvery under-surface gives the flying grouse a peculiar appearance. This and the fact that the wings are curved when the bird glides render the grouse easy to identify during flight. It moves its wings more rapidly than does the blackcock. After a number of flaps it often glides on spread wings; frequently it swerves in the air.

Many naturalists assert that the colour types of the grouse are associated with particular localities. Thus St. John wrote, some eighty years ago: "The difference in colour in grouse is very great, and on different hills is quite conspicuous. On some ranges the birds have a good deal of white on their breasts; on others they are nearly black. They also vary very much in size."

To-day, owing perhaps to interbreeding of the various varieties,

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it is probably not possible to refer any type exclusively to one district. As the result of the inspection of 580 skins sent to the Committee of Enquiry on Grouse Disease, Dr E A Wilson came to the conclusion that, allowing for a good many exceptions, there is a greater tendency to blackness in the birds of the N Highlands than in those of the south. The black variety is more often spotted beneath. The grouse of Wales and the English Midlands are mostly of the red type.

The grouse of Ireland and the Outer Hebrides are more yellow and exhibit less sex difference than those of the mainland of Scotland and England. Some consider these to form a sub-species. The differences between them are not confined to colouring. According to Mr Seton Gordon, the grouse of the Outer Hebrides differs from the Scotch grouse in the following particulars (1) It nests about three weeks later, (2) it lies much closer on the ground, and when flushed seems never to fly far, (3) the cock is less vociferous.

Isolation often leads to the formation of new species. Romanes deemed this to be an important factor in evolution.

It has been asserted—wrongly, I think—that the grouse tends to vary with its surroundings so as to assimilate to these.

Birds of prey, being usually kept well in check by gamekeepers, probably do not kill a sufficient number of grouse to lead to the survival of only those who assimilate most closely to their surroundings. Probably climatic conditions, in some way not understood, affect the colouring of grouse. That the variation is not due to the necessity for assimilation to the surrounding vegetation is shown by the fact that varieties much spotted with white *below* are, as Millais points out, common on ground often covered with snow. Here we have variation in colour where it cannot be seen by a bird of prey.

The female differs little in appearance from the male, except when she is in her breeding plumage. She is perhaps less richly coloured. She is a little smaller and her red wattles are not so well developed. The only infallible way of distinguishing the male from the female is to cut the bird open and ascertain whether it has an ovary on the left of the backbone, or testes on either side. Wilson

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says that in the late summer and autumn the male has some chestnut feathers under the chin, which the female lacks.

The average weight of the female may be taken as from twenty to twenty-three ounces, and that of the male from twenty-three to twenty-five and a half. The heaviest of the males examined by the Grouse Disease Committee weighed exactly thirty ounces. Macpherson says that thirty-two ounces is not an unprecedented weight.

There are various ways of distinguishing a fully grown young bird from one more than a year old. Old birds usually have a groove on the toe marking the place where the claw shed at the moult was attached. If the third flight feather from the outside shows blood when pulled out the bird is a young one. So it is if the lower jaw breaks when the bird is held by it. It is usually possible to crush between the fingers the skull of a young bird. On the wing a bird showing no black in the tail is too young to be shot.

A ptarmigan when in summer plumage is easily distinguished from a grouse by its white wings.

As in the case of most other game birds, sports occasionally occur among grouse. White individuals are not unknown. One of these is figured in the issue of *The Field* dated September 30th, 1926. The issue of that journal dated January 20th, 1927, contains a drawing of a grey grouse shot in Caithness on August 31st, 1926.

The grouse occurs in all parts of the mainland of Scotland where there is extensive heather. It is also to be found on most of the islands off the Scottish coast, except the Shetlands, where repeated attempts to introduce it have failed. In England the bird occurs in all the northern counties, including Lancashire, Cheshire, Shropshire, Staffordshire and Derbyshire—the Pennine Range offering an ideal habitation for the bird. In Wales it is found on the hills as far south as Glamorganshire.

It is also to be seen on Exmoor in some numbers, having been introduced there recently. In three consecutive years of the seventies of last century, Mr. K. Knight, then Lord of the Manor of Exmoor, put down several brace brought from Scotland, but these failed to establish themselves. In 1916 Sir Edward Mountaine repeated the experiment with success. It is reported that quite good bags were

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obtained on Exmoor in 1927. The grouse seems to be fairly established in Somersetshire and Devonshire. Efforts to introduce it into Norfolk and Surrey have failed, despite the abundance of heather.

Grouse live on the moors of Ireland—even on those that consist largely of peat.

The species has been successfully introduced into South Sweden and acclimatised to a high tract of moorland in North west Germany. More recently it has been established in New Zealand, heather having been specially planted for it.

The value of the grouse lies in the fact that it subsists largely on heather and ling and can tolerate a greater degree of cold than most birds, hence it inhabits infertile moors on which few other birds can exist. The grouse has, so to speak, struck out a line of its own as regards food. It is said that the bird is never found where there is no heather. This is not so. Mr F J Stubbs states (*British Birds*, vol x, p 86) that grouse are abundant on some heatherless Yorkshire moors. On these, however, the crowberry (*Empetrum nigrum*) grows. This looks like heather and it is often erroneously called ling. Heather, however, constitutes the main food of the grouse in most places. Clover, berries—particularly bilberry, cranberry, bearberry and crowberry—polypody fern, grass seeds, bedstraw and some insects, but unfortunately not the heather beetle, are eaten. Grouse also feed on grain, they are often compelled to do so when the heather is under deep snow. In such circumstances they may be seen in turnip fields, perched in bushes, on dung heaps and even on the seashore, sometimes many miles from their usual haunts. It has been stated that they take grain only in default of their normal food. This is not so. They are very fond of oats and other cereals.

When the corn is ripe, especially after it has been cut, they flock to the fields. An anonymous contributor to *Baily's Magazine* for 1880 writes (p 11) "That grouse will tend to the corn fields and greedily feed on grain we know. A pot-shooter, who had rented a bit of heather, made it into a little gold mine by purchasing from a farmer a score of sheaves of corn and setting them up on a part of his moor. Grouse came from a great distance to feast upon the oats, and were easily shot in the act of feeding. The person referred

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to sent to his poultryman by this plan about five brace of birds for other sportsmen's two, and so paid his rent and put money in his purse—but not as I think 'honestly.' ”

When feeding in the fields grouse seem to lose much of their wariness.

On September 28th, 1927, when motoring in a closed car along a road running through a moor in Aberdeenshire, we came upon a grouse picking up grit on the road. This bird made no attempt to rise until the motor was almost upon it; indeed, when it did fly it appeared to emerge from under the car! Another grouse rose a few feet in front of the motor, alighted in a field within ten yards of us, perched on a knoll and stood there looking at the car. Later we saw a number of these birds feeding among the stooks within a few feet of the road. We stopped to watch them. They stood their ground motionless with necks extended and eyes fixed on the car. While they stood thus we counted them and found them to number twenty-four. After about a minute, two of the flock took to their wings; they were followed by others, and eventually the remaining birds rose and were joined by about a score from another gathering which we had not observed. The pack wheeled, flew over the car some ten feet above it, and alighted in a field on the other side of the road within twenty yards of us. There had been a grouse drive on the moor near by four days previously. Birds and beasts have an instinctive fear of any large fast-moving object, but they soon learn when such an object is not dangerous, and then their fear disappears. Doubtless those grouse had learned by experience that motors, although noisy, are harmless; hence the unconcern with which they regarded our car.

The easiest way of shooting kalij pheasants on the Siwalik Hills in India is to proceed by motor-car along the Saharanpur-Chakrata Road. At places where this traverses forest pheasants are always to be found on it in the afternoon picking up grit. These rarely take wing until well within range of those in the car: hence, if this be stopped or slowed down, easy shots are obtained. The birds often do not rise until the occupants of the car have alighted.

The fact that the grouse mentioned above did not fly off imme-

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diately a car containing human beings halted close to them, even though the occupants made no attempt to keep still, throws light on the visual powers of birds. Vision is largely a question of attention, eyesight a matter of training.

This is the reason why the vision of birds is so keen in some respects and so defective in others. Had those grouse looked for us they could not have failed to see us. They had eyes only for the car as a single entity. In Northern India I used, during the hot weather, to have my bed placed on the lawn at a distance from the bungalow. The gauze curtains that kept the mosquitos at bay during the night served in the morning as an excellent *cache* from which to observe the doings of the feathered folk. The birds used to strut and hop about on the grass and even perch on the mosquito curtain frame, totally unconscious of my presence.

The fact that the vision of an organism is largely a matter of experience explains why birds are easily caught in nets and nooses, and why they often collide with telegraph wires, wire fences, etc. In this connection I wrote some years ago (*Glances of Indian Birds*, p. 81) "A bird of prey, while floating in the air, does not fail to notice a small animal on the ground 3,000 feet below. Nevertheless the same bird will allow itself to become entangled in a coarse net stretched out in front of a tethered bird. I once asked a falconer how he would explain such inconsistencies in the behaviour of the raptorial birds. He replied that in his opinion the bird of prey sees the net but fails to appreciate its nature, that the falcon looks upon the net spread before its quarry as a spider's web, a gossamer structure, that can be contemptuously swept aside. I think that the falconer's explanation is not the correct one. I believe that the bird of prey really does not see the net. It has eyes only for its quarry. It is not trained to look out for snares, having no experience of them under natural conditions."

As grouse fly low, many are injured by colliding with wire fences. The Committee of Enquiry into Grouse Disease examined a number of grouse and black game of which bones were broken by impact with sheep fences. The risks of such accidents may be diminished by "brushing" wire fences with larch, spruce, brushwood, etc.

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The presence of the above-mentioned grouse on the road traversing their moor is not a matter for surprise. They frequently resort to roads to find grit. This is a *sine qua non* of their existence.

"Good grit is to the grouse," writes Mr. A. S. Leslie, "what raisins are to pheasants and salt to deer." Coarse and fine grit are necessities to all game birds. The Committee on Grouse Disease found much grit in the gizzard of a grouse chick of forty-eight hours. Adult grouse kept in captivity lost weight and died, no matter how plentifully supplied with food, if they were not given grit. Quartz grit is the best for them. Grouse probably take in more grit than do most game birds because the woody heather they eat has to be ground to a pulp. The necessity for taking grit in almost daily must be borne in mind by those who seek to assist grouse in times of heavy snowfall. In addition to providing grain the snow should be cleared from patches where the birds can find grit, or, preferably, grit should be supplied.

Grouse, although they eat grain after the harvest and sometimes in winter, are not injurious to the farmer; on the balance they are beneficial.

Dr. Collinge, as the result of the examination of the crops of 112 grouse at various seasons, estimates that 50 per cent of the food of the bird consists of heather and fourteen per cent of injurious insects. He writes (*Food of Some British Birds*, p. 297): "Investigations extending well over six years all tend to show that the outcry against the injuries inflicted by game birds (particularly the pheasant, grouse, and partridge) on cultivated crops are not substantiated by actual facts—indeed, the evidence is all in favour of these birds."

Grouse feed throughout the day, except in summer when they enjoy a midday siesta. They delight to bask in the sun and are addicted to the dust bath. They roost on the ground, not huddled together like partridges, but a foot or two apart. It is said that as many as a hundred will "jug" in an area of twelve square feet.

Grouse are not migratory, but the conditions of their existence necessitate a certain amount of travel on their part. Heavy snow may cause them to seek snow-free patches of land. Although they go about in packs in winter, each mated pair requires exclusive

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possession of a considerable area of territory for nesting purposes, hence the birds must spread themselves in spring. Thus it comes to pass that a good moor, which disease has deprived of grouse, soon becomes well stocked again. Many years ago a contributor to *Baily's Magazine* cites the case of 5,000 acres of heather that apparently did not hold a single grouse one year. In the following season a few pairs bred, and in the third year 370 brace were shot on it.

A keeper of a moor on the West Coast of Scotland told me that as the result of judicious heather-burning the stock of grouse on the moor increased year by year. Then, not only did the increase cease, but the stock showed a slight diminution, despite the fact that there had been no signs of disease. There had, however, been heavy mortality on some of the eastern moors in the previous season. Doubtless some of the grouse migrated from the western moor to the areas depleted by disease.

Mr J. E. Harting states (*Recreations of a Naturalist*, p. 97) that a grouse pursued by a peregrine falcon has been timed to cover a mile in fifty-eight seconds. This works out to a speed of sixty-two miles an hour.

Grouse are quite capable of a sustained flight of some miles. Mr J. G. Millais states that they habitually fly between Hoy and Pomona, two of the Orkney Islands separated by fully four miles of sea, and Mr D. MacIntyre records (*Field*, October 27th, 1927) that they cross the Sound of Mull.

The grouse has many foes. Snow, frost, rain, drought, and the parasites which attack the bird will be considered later.

Foxes, stoats, weasels, wild cats, polecats, peregrine falcons, golden eagles, hawks, hooded and carrion crows, rooks, jackdaws, ravens and greater black-backed gulls all prey upon the adult bird, or its eggs or young. Some keepers assert that deer eat the eggs. The hooded crow and the black-backed gull work terrible destruction among the eggs. It is probably no exaggeration to say that forty per cent. of those laid are eaten by these birds. The black-headed and common gulls also take the eggs. The fact that grouse sometimes nest and rear young in the midst of a colony of gulls does not prove that these only exceptionally eat their eggs, as it seems to be

a rule in nature that rapacious creatures do not take quarry near their nests. St. John speaks of a pact between the bird of prey and its harmless neighbours. This, of course, is fanciful. The reason why instinct teaches a bird not to attack those having nests near its own is doubtless that the offender would be continually mobbed by all the birds in the locality and so would not succeed in rearing a brood.

Of the four-footed foes of the grouse the fox probably does the most damage. A member of the Committee of Enquiry on Grouse Disease, in the course of a single day's walk, came upon three nests of grouse of which the eggs had been scattered and from which there was a trail of feathers leading to the "earth" of a fox. Stoats and weasels, which are said to hunt in packs, take grouse when "jugging."

Among the enemies of grouse the heather-beetle (*Lochmaea suturalis*) must be numbered. This insect does not attack grouse, but kills heather and thereby diminishes their food supply.

Grouse are monogamous; they pair early in the year and seem mostly to be mated by the end of January. At this period they are very restless, the males often rising some fifteen or twenty feet in the air, calling while so doing. The call of the male may be represented by the words "go back," repeated three or four times; these sounds are preceded by a grunt—*churr*. The call of the female may be described as a low snort or croak. The birds are vocal at most times whether or not they have eggs or young. The cries of the males appear to be challenges to one another. Poachers by imitating them often attract a cock to his doom. At the nesting season the cocks are very pugnacious. Each pair of grouse resents the approach of others on the area surrounding its nest.

Often, after the birds have paired, a fall of snow drives them from their nesting ground to more sheltered quarters. This results in their packing again, but there is no reason for believing that it causes the pairs to separate. If the snow does not lie long, they probably return to their former quarters; often, however, some remain to nest on the lower ground. Thus a heavy fall of snow after the birds have mated may lead to an unusually large number of nests on low-lying moors, and a falling off in the numbers on the higher ones.

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The nest is a slight depression scratched in the earth and lined with a few grass stems or twigs of heather. It is generally situated on a bare patch amid heather of moderate growth, on the sunny side of a tuft, the sitting bird apparently likes to observe what is going on around, but objects to being seen. The nest is rarely in tall heather, rather than build in this the bird will select an exposed site. The nest is often near a burn and almost invariably at a distance from human habitations. Occasionally, however, a pair will nest near the haunts of man. "I found," writes St John (*Wild Sports of the Highlands*, p. 25), "the nest of a grouse with eight eggs, or rather egg-shells, within two hundred yards of a small farmhouse on a part of my shooting ground, where there was a mere strip of heather surrounded by cultivated fields, and on a spot particularly infested by collie dogs as well as by herd boys, *et id genus omne*. But the poor bird, although so surrounded by enemies, had managed to hatch and lead away her brood in safety."

The majority of the eggs are laid in the last week of April and in May, but the time for laying varies with the severity of the season and the altitude of the nest. Eggs may be found occasionally at the end of March and the early part of June.

The clutch generally contains from seven to twelve eggs. The number is affected by many things. Abundant food, a mild season, and paucity of birds seem to tend to the production of large clutches. A clutch laid to replace one that has been destroyed is usually small. Mr A. S. Leslie states that the eggs of an old bird of five years are fewer and smaller than those of a bird of one or two years. As owners of moors and keepers are averse to disturbing nesting grouse lest these should desert, there are no reliable records of the interval that normally elapses between the laying of successive eggs. Of the captive birds under the observation of the Committee of Enquiry on Grouse Disease, one hen took twenty-nine days to lay ten eggs, while another laid only four in twenty-six days.

The eggs, which are very beautiful, vary in colouring. Speaking generally the ground is buff brown, heavily marked with dark red, brown or even black.

Some writers state that the grouse is double brooded. This is

not so, except in so far as a second clutch is usually laid if the first comes to grief.

We have noticed that crows and other creatures steal the eggs.

Rain may lead to the destruction of many. The researches of the Grouse Committee prove this. It is unfortunate that their masterly report (*The Grouse in Health and Disease*) is out of print, difficult to procure and in very few libraries. For these reasons I take the liberty of quoting at some length from the document. Mr. A. S. Leslie states that heavy rain following a drought is one of the principal dangers to which early broods are exposed on low-lying ground. Eggs also may be destroyed by a long spell of wet weather. In 1906, the Committee's field observer saw nest after nest deserted owing to rain. Those on the low ground fared worst. In some the eggs did not hatch at all; in others only half, or even fewer, were productive.

The researches of the Committee indicate that the damage resulting from snow and frost has been greatly exaggerated.

As hen grouse sit through snowstorms, these do little or no harm unless so prolonged that the incubating bird, while the snow is falling, has to leave the eggs to find food. They may then become so buried that she cannot find them on her return.

"It has been recorded," writes Leslie (p. 10), "that in 1908, on a Midlothian moor, a heavy snowfall during laying time covered the nests to a depth of nine inches for a period of ten days; many eggs were lost, some even being laid on top of the snow. In many cases the hen bird returned to the nest after the snow had gone, and laid more eggs beside those which had been covered. Some of these birds hatched out every egg. Other cases have been reported where the eggs were covered with snow for so long that their colouring matter had disappeared, and yet they produced a healthy brood.

"From observations made upon grouse in captivity it appears that during the period of incubation the hen will often leave the nest for several days at a time, for no apparent reason, and will return again and hatch out the whole clutch. This power of absenting herself without disaster to her eggs must stand her in good stead when the severity of the weather makes the task of incubation unendurable; but it is only in the earlier stages of the sitting that her

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absence is unattended with risk, for once circulation has commenced in the embryo, chick the eggs must not be allowed to become cold. Only when the hen is forced to leave the nest on account of heavy rain is there a danger of her deserting the nest permanently. *three days of incessant wet will suffice for this* "

The frost-resisting power of unincubated eggs is almost incredible. The Committee state that there was severe frost for three days in the third week of April 1908, in every grouse district of Scotland, England and Wales, during which period the temperature varied from 10°F to 27°F. Some eggs, so frozen into the materials of the nest that it was impossible either to lift them out or separate one from the other, yielded healthy chicks. Where there were pheasant and grouse eggs in the same nest, the latter only hatched. Some keepers say that the eggs of the grouse are in no danger from frost unless this splits them!

The conclusions of the Committee are

- (1) Frost does not cause universal destruction to eggs
- (2) Some frosts do little or no harm, while others less severe do

"How it happens," writes Leslie (vol II, p 136), "that eggs in one district seem to be better able to withstand frosts than those in other districts must remain a subject for conjecture. Acclimatisation appears to be a more probable solution than any other, for it is clearly brought out by the reports that in the more rigorous climates of the north and east, the eggs were less affected by frost than in the milder climate of the west. Possibly it may be that in the colder districts instinct teaches the parent birds to take greater precautions, e.g. to nest under the shelter of long heather rather than in open situations. Many cases are recorded of grouse protecting their eggs from frost by covering them with loose twigs of heather."

Despite the hard frost the broods of 1908 were well up to the average. It should be mentioned that there is evidence that if breeding is delayed by severe weather the clutches are below the *normal size*.

The period of incubation is twenty-three or twenty-four days. When her eggs are stolen or destroyed, the grouse (as does nearly

every other bird) usually lays a second clutch. According to Lord Lovat, the President of the Committee on Grouse Disease, this second brood never does well. If this be invariably the case, the laying of a second clutch is not only of no use to the species but injurious as needlessly sapping the energy of the mother birds.

A second laying in such circumstances is so common, and the eggs in nests on the ground are subject to so many casualties, that I have always regarded this replacement of a lost clutch as a most important provision of Nature for the preservation of the species.

Doubtless if the second brood is very late in hatching, or if winter comes in unusually early, the state of the birds is as pitiable as Lord Lovat believes it to be. I cannot, however, believe that this is invariably the case. The matter is interesting and calls for further observation.

The cock grouse takes no part in incubation, but he remains in the vicinity of the nest while his mate is sitting, and doubtless is useful in keeping off intruders of the less powerful type. He utters a warning *kok-kok-kok* at the approach of danger.

Although liable to desert when frightened off her nest at an early stage of incubation, the grouse is a very close sitter when the eggs are near the point of hatching. Mr. R. Kearton records (*Wild Nature's Ways*, p. 96) how a sitting grouse allowed him to stroke her back while she was incubating; and only clucked softly when he put his fingers gently beneath her body. He hastened away to fetch his camera, and when he returned he found four newly hatched chicks and three chipped eggs.

I cannot refrain from quoting Edward's admirable account of his experience with a sitting grouse: "I chanced to observe a moorfowl squatted on the ground amongst the heather, close to my feet; in fact I stood above her before I noticed her. Being summer time I at once guessed the nature of the case. On my friend coming up I drew his attention to the bird over which I stood. 'Oh,' he said, 'she's surely dead, Mr. Edward.' 'Oh no,' said I, 'there are eggs or young beneath her.' 'Well,' he answered, 'if so, it is certainly a very wonderful circumstance, but we shall see.' Then, stooping down, he touched the bird, but she did not move. 'She must be

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alive,' he said, ' because she is warm; but she must be wounded, and not able to rise or fly ' ' Oh no,' I once more said, ' she has something beneath her which she is unwilling to leave ' The bird allowed him to stroke her without moving, except turning her head to look at him On my friend's dog, Sancho, coming up and putting his nose close to her, she crept away through the bushes for some distance, and then took to flight, leaving a nest and fifteen eggs exposed to our gaze "

Grouse nestlings are covered with fine soft down of greyish yellow, prettily marked with chestnut and dark brown They are well developed when they emerge from the egg They have been seen scurrying along with part of the egg-shell adhering to the down!

Both parents attend the chicks and conduct them to places where suitable food is to be found It is asserted that the cock leads the van and the hen acts as whipper-in! If there is any swampy ground in the vicinity of the nest the young are taken to it to feed among the rushes or long grass Some idea of the locomotive powers of young grouse may be gathered from the following statement made by an anonymous contributor to *Baily's Magazine* (1880) " I know of a case where two tender birds, which were identified by deformed legs, had travelled nearly eleven miles in the course of three days and two nights "

Young grouse subsist largely on flies, spiders, beetles, caterpillars, fresh shoots of ling, moss capsules, and young bilberry leaves Like the adults, they require grit and sand to aid digestion They can manage without water in normal years, the dew supplementing the moisture in their food As they grow older they gradually adopt the feeding habits of the adult

The mother grouse when surprised with a very young brood sometimes behaves as though her wing were injured

Young grouse are far less sensitive to rain than are baby partridges, but they are liable to be drowned in flooded sheep drains Mr A S Leslie points out that this danger can be diminished in drains with shelving banks by providing little back-waters along which the young birds can escape when the drains become flooded

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Many die of coccidiosis, a disease caused by a parasite. This also attacks adults, but in their case it rarely terminates fatally.

In some years young grouse are fully grown by August 1st; in others they do not acquire their full powers of flight until a month later. St. John was of opinion that grouse shooting should not begin before August 20th.

When not driven for shooting purposes, grouse, usually but not invariably, remain in coveys until the late autumn. Driving tents to break up the coveys and to cause the birds to pack. The composition of the pack varies, sometimes it is a collection of coveys, at others it consists of young birds or members of one sex. The older cock birds lead solitary lives and resort to the summits of hills; habits which render the shooting of them in order to improve the stock easier than it would otherwise be.

Grouse thrive in captivity. "Of all game birds that I have kept," writes Mr. H. Wormald (*Avicultural Magazine* 1912, p. 93), "grouse have proved themselves by far the tamest and most interesting, and have the merit of being tolerably easy to cater for."

The last remark may sound strange in view of the addiction of grouse to heather. This plant, however, is not essential to the keeping of grouse in captivity. Mr. W. H. St. Quintin states (*Avicultural Magazine* 1912, p. 318) that he kept a hen grouse for three years, during which time she never saw heather. His grouse had to be content with meal, green stuff, bird seed (canary and hemp), and such grass and clover as they found in their enclosure.

A contributor to *Country Life* records that grouse kept by him ate strawberry leaves and mounted the garden walls to feed on the leaves of the fruit trees trained against them.

Grouse breed in captivity. The Final Report of the Grouse Committee (*The Grouse in Health and Disease*) contains, on page 487, instructions for rearing grouse. Valuable papers on the same subject, by Messrs. H. Wormald and W. H. St. Quintin, are to be found in the *Avicultural Magazine* for 1912. The last-named treats of the keeping of game birds in general.

Grouse are hardy birds and seem to have no objection to snow, so long as it is not sufficiently deep to prevent them getting at their food.

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Sheep, writes Mr A S Leslie, are often lost in large numbers by being covered up and smothered by snow, "but grouse never, for as they jug in the lee of a peat hag or a moorland dyke they tread the snow under them as it falls, and are found next morning safely collected on the surface, though their fresh droppings several feet below show the level at which they began their night's repose. It is quite common to come upon birds in holes a foot or two under the loose snow. It is only when the snow becomes covered with a hard ice-crust that the grouse begin to feel the pinch of hunger. On the occasions they may be seen in large packs following in the track of a herd of deer or flock of sheep in order to take advantage of the broken surface."

Mr Leslie is doubtless justified in asserting that grouse are never smothered by snow, but not, I think, in saying that they tread this underfoot as it falls. Mr Abel Chapman writes (*The Borders and Beyond*, p 21) "The outstanding feature that characterises red grouse during snow is their instinctive practice of instantly burrowing beneath it before the surface is frozen."

This is in accord with Leslie's statement that it is common to come upon grouse in holes a foot or two under the loose snow.

Bolam records (*Birds of Northumberland and the Eastern Borders*, p 459) that on one occasion he shot in rapid succession, without moving a yard, seven grouse out of some fifty bolting from their burrows.

As grouse are largely dependent on heather for both food and cover, the proper care of this plant is a matter to which owners of moors should pay attention.

Grouse do not eat the woody part of heather, or heather spoiled by the heather beetle, or dead heather, or fox- or brick-red young shoots that have been killed by frost, but they feed on the reddish-brown heather seen in winter, this is not dead, but merely resting.

The heather beetle kills the heather by nibbling at the leaves. It is active only in summer, in winter it lives underground. Where it is numerous patches of dead heather appear. A satisfactory method of exterminating this pest has yet to be discovered. Burning the heather in winter is ineffective, as the beetle, being underground, escapes

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destruction. Mr. P. H. Grimshaw is of opinion (*The Grouse in Health and Disease*, p. 425) that burning the heather between May and August would be effective. This, however, is illegal: the permitted period being from November 1st to April 10th, or 25th by special arrangement.

Burning later than this would interfere with the nesting operations of the grouse, unless it took place some time after the young were hatched.

Another objection to the operation being carried out in summer is that green heather does not burn readily. According to Grimshaw this difficulty could be overcome by spraying it with petrol.

"It would not be necessary," he writes, "for the heather itself to be so thoroughly burned as in the ordinary operation for the purposes of promoting young growth for feeding, and I believe that the fire obtained from the inflammable agent itself might be sufficient to kill the grubs, even if the shoots did not burn so freely as at other seasons."

Grouse do not eat the heather beetle, but blackgame do. Unfortunately, as we shall notice, the last are sometimes destructive to pine plantations.

In order that a moor be well stocked with grouse it must show a good growth of young heather. This end is attained by burning a portion each year. After an interval young plants spring up in the area burned. As the President of the Committee of Enquiry on Grouse Disease admirably puts it (*The Grouse in Health and Disease*, p. 401): the object of the owner of every moor should be to arrange the heather so "that every bird should have its tufts to nest in at the edges of the burned ground, its bare ground to sun itself in and on which to take out its chicks, its older heather for concealment, its breast-high ten-inch heather for feed, its well-matured heather for seed and shelter in winter, and, of most importance, its six- to fifteen-year old heather to keep it in health and vigour in early spring."

The task of the owner of the moor is rendered far more difficult than it would otherwise be by the fact that nearly every grouse harbours a thread-worm known as the Strongyle worm (*Trichostrongylus pergracilis*). The males of this are about a quarter of an

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inch long and the females half as large again. The researches of the Committee of Enquiry on Grouse Disease prove that the parasite causes little apparent harm unless the grouse infested by it is in bad health or harbours it in great numbers. In either of these events, the bird, being unable to digest its food properly, becomes thin and dies. This parasite is the cause of the malady known as grouse disease, which periodically has assumed epidemic form from about 1870 onwards, resulting in great mortality among grouse, sometimes destroying the whole stock of a moor.

The strongyle worm spends its adult existence in the caeca or blind guts of the grouse, where it lays thousands of eggs which pass out of the bird in the droppings. Once outside the bird, the eggs of the parasite remain quiescent for a time or hatch out into larvæ in three days, according to climatic conditions. The larvæ climb on to the shoots of damp heather, where they are eaten by grouse. Inside the grouse they make their way into the caeca, where, in three days, they become adult and forthwith begin to lay eggs. The larvæ produced by these, if eaten by grouse, become adult in three days and produce more eggs, thus the numbers of the parasite increase in geometrical progression. As the strongyle worm occurs in almost every grouse an epidemic is inevitable in any area crowded by these birds for any length of time. Thus to have a moor overstocked with birds is to court disaster.

We must bear in mind that the food supply of the grouse is shortest in the early spring, and therefore this is the season in which the birds tend to crowd at spots where food is available. Thus again to quote Lord Lovat: "Moor management is the science of distributing the stock of birds over the moor so that at no period of the year can any area be so infected by the strongyle worm as to make it a source of danger to the least well nourished bird (that is, to the bird of lightest weight) on that area."

This can be accomplished only by judicious heather burning and shooting.

The researches of the Grouse Committee have proved beyond doubt that the epidemics referred to above resulted from the failure to burn sufficiently.

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Prior to 1850, when one-tenth of the heather used to be burned annually, the disease was unknown. From this date the area so treated diminished until it fell to one-hundreth part of the whole; then came disease.

Moor management is a subject far too big to be dealt with in a book on game birds in general. The final report of the Grouse Committee (*The Grouse in Health and Disease*) is a monumental work on the subject, which should be in the hands of everyone practically interested in grouse moors. During the seventeen years that have elapsed since it was written further experience has been gained.

Is it too much to hope that a new edition of the work will be produced, at any rate in an abridged form?

Here I can but set forth the rules for heather-burning laid down by the Committee:

(1) In order to maintain the vitality and therefore the power of resistance of the grouse, the moor must be so burned as to get the food supply at its highest.

(2) The early spring food supply is the index to the carrying capacity of a moor; therefore heather-burning must be so ordered as to ensure a maximum yield of food in February, March, April and May.

(3) The patch or strip method of burning must as far as possible be pursued in order to segregate the birds and thereby lessen the risk of infection by the strongyle worm and the coccidium.

The Committee are further of opinion that autumn burning is advisable in the interests of both sheep and grouse on all moors, and *necessary* on large ones, and that it is the only possible method of bringing high ground with a northern exposure into a proper rotation of heather crop.

The ideal is to burn the whole area once in fifteen years, but this, of course, cannot be immediately introduced on a moor which has been very inadequately burned in the past, unless the owner is prepared to sacrifice several years of sport.

The Committee give some striking instances of the effect of good management on the grouse stock of the moor:

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<i>Situation of Moor</i>	<i>Acreage</i>	<i>Increase in Grouse on Moor</i>
Yorkshire	14,000	200 to 3,000
Yorkshire	4,000	200 to 2,700
Moray	3,000	150 to 1,500
Nairn	30,000	400 to 3,000

As regards judicious shooting, experience has proved that driving the moor leads to an increase of the stock of grouse, because it affords a means by which the birds can be killed down to the proper limit, has the effect of mixing the coveys and so preventing close inbreeding, and tends to the destruction of the old birds, which are apt to escape if the moor is not driven. These, being stronger on the wing, usually lead the packs and so are likely to be killed in drives.

All the authorities lay great stress on the necessity of killing off the old cock grouse. In the case of pheasants and other polygamous species, where one cock runs with several hens, the unmated cocks are apt to do harm by disturbing the sitting hens, and doubtless old cock grouse, if unpaired, do harm in the same way, as do old barren hens. It is confidently asserted that when these old cocks mate with hens there is no offspring or the young are very sickly.

Thus Mr A J Stuart-Wortley writes (*Fur and Feather Series, The Grouse*, p 148) "In the pairing season the old warriors come down from the heights, fight with and vanquish the younger ones, and absorb the young hens. The latter lay nests full of eggs, but they are sterile, while the more youthful and capable cock bird, who would become the parent of a healthy brood, is either driven off the ground altogether or obliged to remain in a state of combative celibacy. The old hens also, who are beyond the age of laying attack any young hen who may nest near them, driving her off the nest, thus causing the eggs to get cold and the incubation to be abortive. The old barren hens are bad enough, but the old cocks are worse, and both must, by some means or other, be destroyed. You would never dream of keeping birds of this age in a poultry yard for profit."

The above remarks are fully endorsed by the Grouse Committee,

who write (*The Grouse in Health and Disease*, p. 473): "There is no doubt that old birds are a danger to a moor, and tend to the degeneration of the stock, for not only are they more pugnacious than the younger birds, but do not produce such large coveys nor such robust offspring."

If this be the case, it may be asked how grouse managed to maintain themselves when there were no sportsmen to shoot off the old males. The correct answer appears to be that the birds of prey killed them.

Among poultry, cocks after four years cease to be profitable for breeding purposes; it may well be that this is the case with grouse. Probably, under entirely natural conditions, few grouse attain the age of five. The majority are killed in various ways as nestlings, while the adults mostly fall victims to birds of prey. As the old cock grouse frequent the hill-tops they are more liable than other individuals of the species to attack by the raptors.

Nowadays the gamekeeper wages ceaseless warfare against these natural enemies of the grouse, and the sportsman takes their place as a destructive agency; and, if his selection is to be for the benefit of the race, he must imitate nature's methods.

The question of questions for the owner of every moor is: what is the maximum number of grouse my moor can sustain without the risk of a serious outbreak of disease?

Such a question can be answered only by practical experience. Lord Lovat writes (*loc. cit.*, p. 455): "In Yorkshire and Lancashire there are exceptional moors which can carry a pair of grouse to two acres; but in the north of England generally one pair to four or six acres is considered a safe stock on fully developed moors. In Scotland the proportion is about one pair to eight or ten acres, except on the west coast where the normal winter stock is often only one pair to twenty, thirty or forty acres. . . . In a normal season the bag will usually be about double the number of the winter stock, and in a very good year it may be possible to kill as many as five birds to every nesting pair."

Thus the golden rule is: Determine the number of birds the moor can carry safely in March, and, irrespective of all other con-

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siderations, kill down the birds to that limit. Only thus can the risk of disease be averted.

Sheep do not seem to cause the numbers of grouse on a moor to diminish. This subject is discussed in the issues of *The Field*, dated July 7th and 14th, 1927.

Those interested in big bags of grouse are referred to Mr Gladstone's *Record Bags and Shooting Records*. The statistics given therein indicate that the best English moors yield more birds than any in Scotland, and that we may before long hear of 3,000 grouse being shot in a day on one of the former.

CHAPTER X

THE PTARMIGAN

THE ptarmigan (*Lagopus mutus*) is a bird, of exceptional interest, being one of the few species which exhibit the phenomenon of seasonal dimorphism.

At the end of summer the ptarmigan, when not on the wing, might pass for a small grouse, its plumage being grey, mottled with black and buff. In winter it is transformed into a white bird; in spring it becomes parti-coloured. It is interesting to note that one of the two nearest relatives of the ptarmigan—the willow grouse—becomes white in winter, while the other—the red grouse—does not.

The ptarmigan and the red grouse occur in Scotland; the willow grouse is a Continental bird. The winter plumage of each is well adapted to the conditions in which it lives. The tops of the Scottish hills on which the ptarmigan dwells are covered with snow during the greater part of winter, as are the haunts of the willow grouse on the Continent. On the other hand, the moors which the red grouse frequents are often free from snow in winter. Thus, if this species were clothed in white in winter, it would be very conspicuous to birds of prey. The decoloration of the plumage of the ptarmigan, although advantageous, is not without its drawbacks. "In November and even December," writes Mr. Seton Gordon (*Hill Birds of Scotland*, p. 117), "snow is sometimes absent from the highest levels, and during times such as these, ptarmigan offer an easy mark to the eagle and hill fox, for they stand out against the dark hillsides like miniature snow wreaths, and are visible at a distance of, I should say, a full half-mile. If there should happen to be any fields of snow on the hills, the ptarmigan frequent these fields throughout the day, venturing off only a short distance to feed. On such a snow-drift every ptarmigan of that particular hill may resort, knowing

Ptarmigan in Summer Plumage



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that there, and there only, are they protected from the keen sight of the eagle, for the great bird is constantly sailing on motionless wings across the hill faces during the hours of the short winter day "

It may be doubted whether ptarmigan resort to the snow because they know their plumage assimilates to it. If they are aware of this they are incapable of reasoning that when squatting in the snow they are hardly visible from above and so comparatively safe from attacks by birds of prey. It may be that they have discovered by experience that they are more free from molestation on the snow than in any other part of their habitat, and in consequence resort to it. As Mr F Tinn well says, birds observe much and reason little.

Not improbably ptarmigan take to snow as ducks do to water, they repair to it because they like the feel of it, as other birds bask in the sun, the sensation of warmth being agreeable to them.

Ptarmigan, owing to the feathery covering of their toes, are able to walk on soft snow without sinking into it.

The ptarmigan, willow, and red grouse are closely related and are descended from a common ancestor, the question then arises was this a bird that changed its plumage in winter or did it remain dark-coloured throughout the year, in other words, is the ptarmigan or the red grouse the more primitive form? Most naturalists seem to think that the former is the more primitive.

Their views are thus set forth by Mr P Westell (*British Bird Life*, p 210) "It seems that at the glacial period the north and north western part of Europe was one continuous sheet of ice, not forgetting what is now the bed of the North Sea, and, this being so, it was a matter of no difficulty for grouse to spread themselves over the whole Continent and advance to Scotland. As the glacial period disappeared, the climate became warmer, and these birds and others found in the arctic regions had perforce to choose one of two alternatives—i.e. either to alter their mode of life, plumage, etc., so as to meet the requirements of the new conditions, or repair to the mountains where the old condition still survived. The willow grouse chose the former method of change and became the red grouse, the ptarmigan adopted the second, and was, and still is, the ptarmigan."

This, though plausible, is probably inaccurate.

Even as it is more blessed to give than to receive, so is it easier to lose than to acquire. This any man may prove for himself by frequenting the racecourse, or indeed without going near it!

The above argument assumes that the willow grouse when it became necessary, was able, unconsciously, of course, to manufacture pigment for its plumage. Men of science are prone to assume that organisms can make something out of nothing; some have gone so far as to assert that a "fortuitous concourse of the atoms" produced living out of dead matter, and the living protoplasm so inaugurated has been adding to itself ever since and growing in complexity until man was evolved!

It is probable that white in the plumage is a late development. The first plumage of the baby ptarmigan is not white, and the winter feathers of the ptarmigan are dark when they appear and become white by depigmentation; hence it seems reasonable to infer that the ptarmigan is descended from a bird of which the plumage was dark in winter.

It is, of course, possible that red grouse is the primitive form, and that owing to the advent of a glacial epoch, its plumage became white in winter. Later, when this cold period passed away, the grouse which no longer lived in a country that was snow-bound during the winter ceased to change their plumage at that season.

It may be mentioned that the blue hare ceased to turn white in winter about fifty years after its introduction into the Faroes.

Cold seems, in some way, to lead to the withdrawal of pigment from the feathers of the ptarmigan and willow grouse. Mr. J. G. Millais believes that the assumption of the white plumage varies with the mildness of the weather.

It would be interesting to keep a ptarmigan in a warm hut on a mountain through the winter to ascertain whether the warmth would prevent the depigmentation of its plumage. In this connection Mr. F. Finn informs me that a pair of willow grouse, and a chick they had reared, in the Zoological Gardens, London, began to turn white in an exceptionally hot September. On the other hand, there is the case of a lemming kept by Sir John Ross in the cabin

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of his ship until February 1st, up to which date it retained its colour. He then exposed it to cold. On the following day some white was visible in its pelage, which in a week became entirely white. By clipping the white hair-tips Ross was able to restore to the animal the appearance it presented when in autumn pelage. This experiment seems to prove that the hair became depigmented. Middendorf, however, suggests that the hairs of the winter coat were all present but remained concealed so long as the animal remained in the cabin, the unnatural warmth retarding their growth and so delaying the shedding of the old hairs, that the sudden exposure accelerated the growth of the new hairs, which rapidly attained their full length and concealed the far shorter hairs of the old coat, and that finally sufficient time did not elapse to prevent the old coat being cast, and, therefore, Ross was able to bring the old coat once more to the surface by cutting off the ends of the newer and longer hairs. If Middendorf's hypothesis were correct the cutting the ends of the long hairs would have caused the pelage to appear speckled black and white. What seems to have happened was that the blanching began at the tips of the hairs and had not reached the bases at the time of the death of the lemming. Welch has shown (*Proceedings of the Zoological Society*, 1869) that in the case of the coat of the American hare the blanching usually occurs at the tip and does not always extend to the whole of the shaft of the hair.

It is interesting to notice that of several Arctic foxes kept in the Zoological Gardens, London, the coat of one only whitened during the winter. It would thus seem that animals vary constitutionally, and, in consequence, cold sufficient to stimulate the change in one individual may not suffice to produce this effect in another. This may be true of birds. Captivity does not seem to affect the colour-change and moult of all individuals of a species in the same way.

The turning white of the ptarmigan is not due entirely to the influence of cold. The flight feathers remain white throughout the year, while all the tail ones, except the middle pair, remain black. The white tail feathers lie hidden beneath the median white ones except during flight.

It is usually said that natural selection has resulted in the plumage of the ptarmigan being white, and that of the grouse dark, in winter. This is doubtless true, but it does not carry us very far.

Until we discover what makes mutations appear we must confess that we are almost completely in the dark as to the causes of the origin of species. Natural selection goes a long way to explain why some mutations persist while others do not: that is all.

As the ptarmigan inhabits treeless and almost bushless tracts of country which birds of prey continually quarter for quarry, it is obvious that it stands in greater need of being protectively coloured than most birds do. In its case the natural selection which weeds out conspicuous varieties must be very rigid, hence at all seasons the bird assimilates very closely to its surroundings. The red patch over the eye certainly is rather conspicuous to anyone on the ground, but probably not to a bird soaring overhead.

At other seasons the parti-coloured or mottled plumage makes it difficult to see the ptarmigan so long as it remains motionless.

Once a man stretched forth his hand to pick up a stone—lo, it was a ptarmigan! Mr. E. T. Booth relates how after a futile search for a nest of the bird, his dog, who had been sitting in the midst of a group of men, got up, moved less than a yard and re-seated itself on a sitting ptarmigan!

The hue of winter plumage of this species has given origin to many of its local names: white grouse, white game, white partridge, snow chick; and its rocky habitat explains why it is sometimes called the rock grouse.

The question naturally arises: How does the ptarmigan contrive to exist in the snow—upon what does it feed?

The crowberry (*Empetrum nigrum*) is to the ptarmigan what bread is to man in Europe. This plant does not seem to grow much below 1,500 feet in Scotland, and normally the ptarmigan does not dwell in lower altitudes. Where the crowberry is absent, writes Ogilvie, "it is noticeable that the ptarmigan are generally absent too; in fact the ptarmigan ground commences at about the same level as the crowberry, and the distribution of the one appears to be dependent on the presence of the other. . . . This sturdy creeping

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plant cares little for the winter cold. It stands sufficiently high to be seldom entirely buried, at any rate in the more sheltered places, e.g. the sides of rocks and so on. Here one finds the footmarks of innumerable ptarmigan that have been scratching their dinner out of the snow. Of course, the weather may become so severe, and the fall of snow on the hills so heavy, that the ptarmigan are driven down below the crowberry limit, and on to the heather ground to find any subsistence at all. But it is very evident that they are uncomfortable in their new quarters, and they will return to the higher slopes at the earliest possible opportunity. *what the heather is to the grouse the crowberry is to the ptarmigan*."

Mr. J. G. Millais and Mr. Seton Gordon, who have braved blizzards in order to watch the doings of ptarmigan, give graphic accounts of the way in which these birds seek sheltered gulleys during a severe snowstorm.

Writing of Norway, Millais says "Two days of ordinary snow made no impression on these hardy birds, but a blizzard from the north on the third day made all the ptarmigan, to a number of, I should say, 800 to 1,000, leave the tops and north faces and come flying in coveys to a sheltered corner. They kept arriving for about two hours in a continuous stream. Next morning I passed through this sheltered hollow and moved thousands of ptarmigan, which only flew for a short distance."

Gordon describes how in a blizzard in Scotland the birds betook themselves, on wing and on foot, to a sheltered corrie, the following morning he saw them feeding on the tender shoots of the heather.

Next to the crowberry, the billberry constitutes the most important food of the ptarmigan. Ogilvie says that, except when there was deep snow, the crop of every bird shot by him contained a fair proportion of the leaves and stunted stems of the blaeberry. The dark berries of this plant are devoured greedily by ptarmigan. Both heather and ling are eaten not only when other food is not available, but in addition to such.

Ptarmigan roost on the ground, even when this is covered with snow. One would expect to find them sleeping huddled together to protect themselves from the cold prevailing at the altitudes of

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the roosts, but Millais says they roost in somewhat scattered formation. Their plumage would appear to be a perfect non-conductor of heat; moreover, ptarmigan seem to like the feeling of the soft snow about their bodies and feathered legs and toes. Gordon states that during the summer they seek out snowfields in which to roost.

The chief enemies of the ptarmigan in Scotland are the golden eagle and the hill fox. Mr. Seton Gordon found inside one of these foxes three ptarmigan, including the wings and feathers.

The behaviour of ptarmigan in the presence of man varies very greatly.

"Being visited by the sportsman but rarely," writes St. John, "these birds are seldom at all shy or wild, but, if the day is fine, will come out from among the scattered stones, uttering their peculiar croaking cry, and, running in flocks near the intruder on their lonely domain, offer, even to the worst shot, an easy chance of filling his bag. When the weather is windy and rainy, the ptarmigan are frequently shy and wild; and when disturbed, instead of running about like tame chickens, they fly rapidly off to some distance, either round some shoulder of the mountain, or, by crossing some precipitous ravine, get quite out of reach. The shooting of these birds should be attempted only on fine, calm days."

Lord Walsingham writes (*The Badminton Library: Shooting*, p. 40): "In fine weather . . . they well may be compared for tameness to chickens in a farmyard. . . . If the weather should suddenly change and become wild and windy . . . the nature of the quarry undergoes almost as sudden alteration as the weather itself; instead of running complacently along the ground, apparently regarding the dogs and sportsmen as curiosities rather than as objects to be feared, the ptarmigan are now easily disturbed, and, rising at greater distances, circle round the highest peaks and rocks, not pitching as before so soon as they pass out of sight over the skyline, but wheeling round and frequently continuing their flight until they have put the whole length of the beat which has already been traversed between them and their pursuer."

Millais states that he has shot ptarmigan with a catapult in calm weather. This sluggishness, although usually exhibited only when

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the air is still, may show itself under other conditions. Gordon states that he has been able to walk within a few yards of a pack on an open hillside with a strong wind sweeping across from the west.

The flight of the ptarmigan is swift and characteristic, rapid wing-beats alternate with glides on outstretched pinions. When on the wing ptarmigan generally follow the contour of the mountain side, but are capable of rising almost vertically and of making sharp turns. Owing to the white wings, a covey from a distance has somewhat the appearance of a number of white pigeons.

During the pairing season, which normally is in April, the males frequently utter their loud croaks, beginning before daybreak. There is a certain amount of fighting at this time of year, presumably for territory. The males make little aerial sallies and strut on the ground with tail raised and spread.

Like the grouse, the ptarmigan is monogamous.

The nest is a hollow scraped in the ground, often with a little lining, sometimes in the open, at others more or less sheltered by stones, crowberry plants, or other vegetation. Mr. Seton Gordon states that he has never found a nest at elevations below 2,500 or above 3,600 feet. Most nests are on the southern faces of the hills.

From six to nine eggs are laid; they are very like those of the grouse. The markings on them wash off like those on the eggs of the oriole. The time to look for eggs is from about May 20th to the end of June. One is laid daily. The hen does not begin to sit until the clutch is complete, before this the eggs are kept covered. The male does not appear to share in the duties of incubation, but remains near the nest and frequently utters his mournful note.

The female sits very close. When the eggs are about to hatch and the frenzy of incubation is at its height, she will sometimes allow herself to be stroked or the eggs to be taken from under her. We have already noticed that a ptarmigan allowed one of Mr. Booth's dogs to sit upon her. That naturalist records how on the same day another sitting ptarmigan was discovered through one of the pannier straps falling on her back between the legs of the pony as the lunch was being re-packed, after a protracted search for the nest everywhere except under the pony.

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When surprised with her brood, the hen ptarmigan sometimes behaves as though her wing were broken; on such occasions the male runs in front as if to check her.

The period of incubation is about twenty-two days. The young emerge from the eggs covered with down coloured like that of the baby red grouse.

They are able to run when hatched, and become capable of flight at a very early age—it is said only eight days after coming out of the shell.

A large percentage of eggs comes to grief. Hoodie crows, ravens, and gulls devour eggs and young birds; heavy snow is destructive of both. When a clutch of eggs is destroyed another is usually laid. The young become full grown by the end of August. "

The ptarmigan seems to occur on all the higher mountains of Europe, Asia and North America, except the Himalayas and the Andes. It is common in the Alps and Pyrenees. As in the case of other non-migratory species of wide range, it is split up into a number of local races or sub-species.

According to its mood the ptarmigan is the easiest or the most difficult of birds to shoot. Stalking ptarmigan when wild, like shooting chukor in the Himalayas, is a most laborious form of sport. The birds, by flying gracefully from one ridge to another, give a practical demonstration of Euclid's theorem: "Any two sides of a triangle are greater than the third."

Lord Walsingham advises the sportsman to take with him a steady pointer or setter. "In traversing the ground," he writes, "it is best to walk as much as possible on one level—that is, to work your way round the hills rather than up and down them."

It is usually said that driving ptarmigan to the guns is an impossible feat. This is not the view of a contributor to *Baily's Magazine* (April 1873, p. 224): "Before driving became the fashion," he writes, "we were content to go climbing about among the rocks, getting a shot here and there, and coming home with bruised shins and a very modest bag of birds; but we have changed all that now, and we find it much pleasanter to climb to a point of vantage and have them driven rocketting over our heads."

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The method of driving practised by him is to select a part of the mountain near the summit, where the slope is not very steep. Post the guns in a line, one near the summit, the next fifty yards lower, and so on, each gun being apprised of the whereabouts of the others, as ptarmigan often fly low. Two sets of beaters are sent out, one on each side of the line of guns. These start simultaneously and beat along the hillside towards the guns. He states that a drive thus organised yielded forty-eight brace to four guns. The same ground was beaten twice, in the morning and again in the afternoon, the second beat yielded more than the first.

The record number of ptarmigan shot in Scotland is probably 122, obtained by the Hon. Geoffrey Hill on August 25th, 1866 (See *The Badminton Library Shooting*, p. 44).

CHAPTER XI

THE BLACK GROUSE

THE bird we are about to consider suffers from a plethora of names. The more common of these are: Heath Cock and Heath Poult, Blackgame, Black Cock and Grey Hen, Black Cock and Brown Hen, Black Grouse.

Heath Cock, which is a translation of *Coq de Bruyère* (the French name for the capercaillie), has fallen into disuse. Sportsmen nowadays generally speak of the male as the black cock and the female as the grey hen; but, as the prevailing hue of the latter is brown rather than grey, the obsolete designation "brown hen" is more appropriate.

Most recent writers call the bird the black grouse. This name is convenient, although somewhat misleading, as the bird does not belong to the same genus as the red grouse; moreover, the hen is not black.

Formerly the black grouse was deemed to be a species of capercaillie, and men of science styled it *Tetrao tetrix*. Recent anatomical researches, however, have caused it to be relegated to a different genus; hence it is now designated *Lyrurus tetrix*.

The male is considerably larger than the red grouse and has a longer tail, the outer feathers of which have an elegant outward curl. The plumage is glossy black, with a beautiful steel-blue sheen on the head, neck and back. The black is enlivened by a conspicuous white wing-bar, some white under the tail, and a bright red patch round the eye, which swells into a kind of comb at the breeding season. The chief glory of the black cock is his handsome tail. No Highland piper considers himself properly attired unless his Glengarry bonnet be adorned with the curled tail feathers of a black cock.

Towards the end of May the male begins to moult into what may be termed an "eclipse" plumage. This is dull brownish black. The



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crown and back of the neck are rich brown, finely pencilled with black. The lower throat and cheeks are mottled black, pale yellow, and white. This plumage gradually becomes suffused with black, and by September, the cock is once more in full dress.

The hen is considerably smaller. Her tail is but slightly forked. Her head is finely mottled black and buff, her upper plumage is a mixture of black, rufous and reddish buff, each feather having black bars or a patch of this hue in the centre.

The outer webs of her flight feathers are mottled brown and buff, the inner webs are plain brown. Her lower plumage has narrow cross bars, a few of the feathers being tipped with white.

The legs—but not the toes—of both sexes are feathered.

The male weighs from four to four and three quarter pounds, and the female from two and a half to three.

The above description applies to the black grouse in the British Isles.

In the Continental form the plumage of the female is somewhat brighter and, in consequence, some systematists consider that there are two sub species—the British and the Continental. Such designate the former *Lyrurus tetrix britannicus*.

Pure white individuals have been shot in Scandinavia, and pied ones in the British Isles. In a recent issue of the *Shooting Times* Mr R. Clapham has recorded a variety having no gloss in the plumage and the white feathers under the tail ribbed with white.

Old and barren birds often assume male plumage to a greater or less extent. In the British Isles the black grouse is found in most parts of Scotland, and occurs most abundantly in the Highlands. It is, however, less common than formerly. An interesting paper on this subject is to be found in the *Scottish Naturalist* for 1927.

In England it used to be far more numerous and widely distributed than it now is. It is most plentiful on the moors of the northern counties and of Devonshire, Somersetshire, North Wales and Staffordshire.

It also occurs in suitable localities in Northern and Central Europe.

On the Continent it affects forests, in Great Britain it is found

chiefly on what Mr. J. G. Millais aptly describes as "the fringe of the forest." It often occurs in the heather along with the red grouse, but, I believe, only on moors near plantations of birch and mountain ash.

The fondness of the bird for birch is reflected in its French and German names—*Coq de bouleaux* and *Birkhan*. *Coq de bruyère*, although said in French dictionaries to be a grouse, is the word used by French naturalists to denote the capercaillie.

Mr. J. G. Millais, in his admirable account of the black grouse. (*Natural History of Game Birds*), discusses at some length the causes of the diminution of the species in the British Isles. He considers these to be a superabundance of old cocks and barren hens, and the overshooting of the young birds; also the fact that the hen is prone to desert her eggs and often does so when disturbed by sheep dogs. The hens lose their fertility when they are a few years old, and they and the old cocks worry the young hens. He advocates the systematic shooting of the old cocks by stalking them with a rifle in October, and shooting both them and old hens at the lek after May the 15th. Any hens found there so late in the season are almost certainly barren birds, as, by that date, all the others are busy with their eggs. He further suggests that no young hens should be shot. Doubtless indiscriminate shooting has been a potent cause of the diminution in the numbers of this fine game bird. Harvie Brown states that in New Galloway advantage used to be taken of the birds' fondness for grain. Immediately after the harvest an enclosure of hurdles wattled with corn was made, in which grain was sprinkled. Blackgame enticed thither were shot for the market.

Complaints have recently been made (see *Country Life*, 1927) that of late some over-zealous underlings of the Forestry Commission have been waging war against blackgame on account of the damage they cause to young pines.

The black grouse is one of the few game birds which may be said, with some show of reason, to be injurious to cultivation.

The main counts in the indictment against the species is that it eats grain and the young shoots of conifers.

St. John considered blackgame to be more injurious to crops than

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any other sporting bird. They find out the corn fields and take long flights to them. They also visit the stackyards in search of grain when other food is scarce. The charge that black grouse are destructive of young pines must be regarded as proven.

In 1909-10 and 1910-11, when frost killed all the buds of the birch (on which these birds ordinarily feed) on the moors and other exposed places in the West of Scotland, the blackgame attacked the conifers. The young larch plantations suffered the most, many of the trees were ruined by being stripped of the terminal buds on the main and lateral shoots. Corsican pines were not attacked.

Mr H. S. Gladstone states (*Scottish Naturalist*, 1923) that a wood of nine acres of larch planted in January and February 1919 with two-year-old native larch, was attacked by blackgame to such an extent that many of the trees were killed and the majority grew up as "scraggy bushes." In February 1923 more trees were planted, and 4,500 out of 5,000 two-year-old Japanese larch were destroyed by a small pack of from eight to twelve grey hens. Blackgame are not unusually abundant in the locality, the bags for three successive years numbered thirty-three, thirty-five and twenty-five.

Black grouse also attack the Scotch pine. Mr Seton Gordon states (*The Hill Birds of Scotland*, p. 134) that they caused so much damage to the young pine trees in the Government plantation at Inverliever that the planting of the latter had to be discontinued.

So much for the case for the prosecution. In defence it may be said that, as blackgame feed on pines only when their normal food supply is lacking, such destruction could easily be averted, if, on the comparatively rare occasions on which the supply of birch buds fails, grain be provided for the birds. Again, despite this failing of blackgame, conifer plantations in Scotland have flourished in the past.

A most important point in favour of the black grouse is that it is very partial to the heather beetle (*Lochmaea suturalis*). Ogilvie examined the crops of a number of black game, and in each he found about three hundred of the beetles that cause the heather disease. If this beetle be not kept in check heather might disappear from the United Kingdom; this would mean the extinction of

grouse and the failure of the main food supply of vast flocks of Scottish sheep.

Ogilvie found the crops of black grouse, examined by him in December and January, filled with birch buds and twigs. A few contained a considerable proportion of green but leafless stems of bilberry cut into half-inch lengths. Heather, oak galls, and the fruit of the mountain ash, bilberry, raspberry, strawberry, barberry and rowan are freely eaten by black grouse. The old males frequently resort to corn stooks. Black game are often flushed from turnip-fields. In hard weather they may be seen perched on hawthorns eating the fruit. Like other game birds they must have grit. They are swift on the wing and are adepts at threading their way among trees. They have wonderful turning power in the air. Sometimes, when being driven down wind, they will turn and travel in the face of a gale. They fly by preference up wind. Millais suggests that owing to the length and shape of the tail they are bothered by a following breeze.

At times when they are not breeding they associate in small parties of between one and two dozen. These are usually composed of individuals of the same sex. The young males generally go about by themselves. Sometimes large packs are seen. Millais records observing one composed of some three hundred birds.

Like red grouse and capercaillie, black grouse are able to maintain themselves for some time in a snow-bound country. Mr. Abel Chapman writes (*The Borders and Beyond*, p. 25): "A whole pack of blackgame may be so heavily snowed on by night as to be held prisoners till the thaw—possibly days or even weeks later."

On the Continent the black grouse often migrates long distances, presumably in search of food. In England there is no necessity for this, but the birds sometimes make considerable flights. Millais states that he has seen them flying from the Quantocks to the Blagdon Hills, a distance of about nine miles.

Black grouse occasionally perch in trees, sometimes roosting in them: more usually they jug on the ground. The fact that a bird able to perch comfortably in trees elects to roost on the ground affords strong evidence that a resting bird gives out little or no scent.

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A very interesting habit of the black grouse is that of resorting in the autumn, winter and spring regularly, before daybreak and in the evening, to what perhaps should be described as a tourney-ground—a grassy, knoll studded clearing in the forest. Such an area is usually termed a lek, this being the Scandinavian name for it.

The performances that take place on the lek have been described by several eye-witnesses. That their accounts do not agree is easily explained by the fact that the movements of the birds are very complicated, the participators numerous, timid and partly hidden by the grass, and much of the performance takes place before daylight. If several beings from another planet were to alight in England on a foggy November afternoon, and each to witness a Rugby football match from afar, it would not be surprising if the accounts of these beings, none of whom knew anything about football, did not agree.

The two observers who have been at greatest pains to watch the doings of black grouse on the lek are Mr J G Millais and Mr Edmund Selous. As I have not had the opportunity of witnessing the performance I feel some diffidence in describing it.

A careful perusal of the accounts of the above-named observers indicates that what happens is more or less accurately set forth below. It must, however, be borne in mind that inferences have been drawn from what has been observed, and it may be that these inferences are not always correct. In any event, what follows may be useful in indicating points on which future observers should focus attention.

The leks appear to be the places where black grouse pair. In order that a male may be in a position to pair he must secure a station on one of these.

Mr Millais states that, although the hens breed in their first year, the young cocks are not allowed to fulfil parental duties until they are three years old. I venture to think that the above statement is a mere guess. A definite pronouncement of this kind is justified only after the most elaborate observations by numbers of patient watchers. First, all the young birds of a locality would have to be

ringed, then all the leks in the vicinity watched for several hours day during the greater part of the season for four successive

As Mr. Millais' account of the black grouse in his *Natural History of Game Birds* displays much valuable and original information, is most charmingly written, it is with great regret that I am constrained to question some of the statements made therein. It is thousand pities that Mr. Millais does not state how much of it is based on his own observation and how much is derived from the statements of keepers, shepherds and other country folk.

It is quite likely that young cocks are often unable to obtain foothold on any of the local leks, not being strong enough to overcome the old birds, but that none of them breed until they are three years old I cannot believe.

Neither the males nor the females resort to the leks in summer. The former are then in eclipse plumage, and the latter busy with their eggs or young.

As the males come into breeding plumage in the autumn they visit the leks. For a time there are presumably sufficient places to hold all comers. So long as this is the case the only *casus belli* seems to be the trespass by one occupant on the preserve of another. When every position on the lek is occupied and an outsider tries to win a foothold the fighting becomes serious. December is the month when it occurs in real earnest. Millais gives the following account of such a contest: the combatants with heads lowered "stand and fence after the manner of bantams until one, by superior tact and rapidity, suddenly seizes his adversary by the 'scruff' of the neck and gives him a right good dusting, handling him in no gentle manner with his strong bill, whilst he beats him over the head with both wings, the latter making a loud noise." It is said that these fights occasionally terminate fatally, but more usually the defeated bird retires before he is seriously injured.

Millais states that at intervals during each separate fight the male birds emit a call which he likens to the caterwauling of cats having sore throats, being "wild and unmusical in the extreme."

That the most serious fighting takes place in December and not just before the hens lay indicates that the bone of contention is a

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place on the lek and not possession of a female. Presumably by January the cocks who have failed to win a position on the lek depart and reconcile themselves to a condition of bachelordom. After this happens the only cause of a scuffle is the overstepping of his boundary by an occupant of the lek. Much of the fighting that takes place then seems to be in the nature of friendly sparring, merely the means of dissipating superabundant energy. Such fighting is thus described by Mr E. Selous (*Zoologist*, vol. xiv, p. 181): "One bird would often run at another, sometimes for nearly the whole length of the ground, or two would meet and then stand fronting and threatening to leap at one another, which, however, they but seldom did, nor was there anything that really deserved the name of a conflict."

The birds seem simply to lack the courage to fight. They come on with every appearance of rage, then stop face to face, turn about, stand with dilated feathers and bent heads, side by side, front one another again, make an abortive half spring, think better of it, one or both returning from whence they came. They do everything in fact but fight, but in that they make a very tame and poor figure. Still, if they actually do make a spar or so, it is with all the violence that could be wished, but the flame that has leaped suddenly up expires as suddenly. Now and again, indeed, there is a fight of some twenty seconds or so—even perhaps a minute—and then it makes a fine show."

The males seem always to be the first to arrive at the lek. Before daybreak they give vent to their challenge calls, which Millais likens to the sound made by a distant goods train passing over loose rails. Their cries are audible from a distance of two miles. The females apparently come to the lek for the sole purpose of mating. "We will suppose," writes Millais, "that the observer has come early on the scene, before the grey hens have made their appearance. The approach of one of the latter is the signal for the immediate cessation of hostilities on all sides, and intense excitement prevails among the black cocks. Her approach has been observed by a single bird, who has been sharper than the rest in detecting the lady afar off. (he will) suddenly draw himself up to a rigid position of attention, till he is sure she is really coming. . . Then he

throws himself into the air and flutters up a few feet, uttering while hoarse notes with all the power and effect he can muster. . . His example is immediately followed by all the others, who alighting dance about in the most absurd manner." The having come to the lek, walks about on it. As she does so cock proceeds to strut and display in front of her, spreading tail, of which she has a back view. She may pass on to another or remain by him, in which case he treads her. Often while this happening another male attacks the favoured one and a ensues.

The following statement made by Mr. Millais, I venture to gest, seems based not upon actual observation, but on the statements of gamekeepers or others who have drawn extensively on the imagination: "Each hen on arrival . . . is appropriated by one or other of the successful cocks, till the harems are filled up, one cock having at times as many as six or seven hens. As the season advances, after the first few mornings of the hens coming to the ground, they resort to the same spot each day, and stay with the same cock who has previously trodden them, and are not interfered with afterwards by other cocks, who acknowledge the superior claims of the male to whom they rightfully belong."

The above is not in accordance with the observations of Mr. E. Selous, who thus describes what he witnessed on May 16th, quite at the end of the lek season (*Zoologist*, vol. xiv, p. 259): "First black-cock down at 3.20. . . . Thus this first arrival was some ten minutes after the usual time, and everything else this morning, both the actions and deportment of the birds, and the diminished powers of their vocal performances, showed a waning energy. But one hen came to stay; another may have flown in, but, if so, soon went again, without being courted. . . . The one hen that stayed was courted in the usual manner, one would say successfully, except that the numerous interferences, at the end, seemed also to be successful. So uniformly is this the case that it really seems surprising that fertile eggs should be laid by the females of this species at all."

Selous is probably correct when he writes: "A blackcock

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meeting-place is, in fact, a sort of Yashawari, where the males stand, each in his place, and to which the hens come to walk about and choose from amongst them "

Selous believes that the blackcock, like the ruff, is both polyandrous and polygamous, that a cock pairs with several hens and a hen with several cocks, in other words, that they are promiscuous in their intercourse, birds parting and losing all interest in each other as soon as they have copulated

It is, of course, possible that both Millaïs and Selous are right, that some hens return day after day to the same cock while others do not There seems to be but one way of determining whether this is so, and that is to watch, daily, the actions of cocks and hens which have been marked by the observer, or have some peculiarity by which they can be identified In the case of ruffs (who, like black grouse, resort to leks) the males vary so greatly in colour that it is often easy to recognise particular individuals In consequence Selous was able to satisfy himself that a reeve does not pair with the same ruff on her various visits to the lek His observations further indicate that some ruffs offer greater attractions than others on a given day most of the reeves visiting the lek paired with one favoured bird Although his belief that the hens choose their mates on the lek is justified, it may be doubted whether he is correct in asserting that the hens are attracted by the most handsome male, or in endeavouring to recuscitate Darwin's theory of sexual selection This hypothesis is based on the assumption that birds have æsthetic tastes and appreciate beauty There is much evidence tending to show that this is not the case

The nest of the grey hen is invariably on the ground, often among heather or bracken, sometimes within a plantation, not infrequently in heather under the shelter of a young tree, occasionally in the vicinity of water It is a slight depression, sparsely lined with dry stems or leaves

The eggs vary from six to ten in number The shell is of yellow ochre hue, blotched with reddish brown Incubation occupies about twenty four days The hen alone sits when scared off the eggs she is liable to forsake them altogether Most of the young are hatched

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in June. They emerge from the egg covered with down mottled yellow, chestnut, and black, and are then able to walk. They follow their mother and feed largely on grass seeds, ants' eggs and insects. The mother, when surprised with her brood, sometimes behaves as though her wings were injured.

The young birds are able to fly when about a fortnight old, but do not usually acquire their full powers of flight until the end of September. When immature they are very easy to shoot. August 20th is too early a date for the opening of the shooting season. This is recognised in the south of England where the close season continues to the end of August. Many naturalists and sportsmen would extend it to September 30th. As in the case of the grouse the shooting season closes on December 10th.



CHAPTER XII

THE CAPERCAILLIE

THE capercaillie (*Tetrao urogallus*) is the Goliath of British game birds. The male is nearly as large as a turkey. According to Lloyd, a cock in South Sweden sometimes weighs as much as sixteen pounds. Such ponderousness is not attained elsewhere. In Scotland the cock weighs from seven to twelve pounds and the hen from four to seven. It is not unusual among birds for one sex to be larger than the other, but such disparity in size as that exhibited by the capercaillie is uncommon. Another curious feature presented by this species is the difference in the size and shape of the bill in the sexes. That of the male is two inches long, the upper mandible is convex and hooked, the tip projecting downwards over the lower mandible, thus the organ has much the appearance of the beak of a bird of prey. The bill of the female is of the ordinary game bird type. This difference in the bill is reflected in the feeding habits of the sexes. The cock subsists largely on fir and pine shoots and uses his bill as a pair of scissors to snip these off. This diet imparts to his flesh a flavour of turpentine. The hen feeds mainly on the ground, after the manner of most game birds.

The head and neck of the male are of ashy hue, the former being adorned by a patch of bare scarlet skin over the eye. The bearded chin, the lower abdomen and the tail are black.

The breast is dark glossy green. The lower back is ashy, marked with wavy black cross lines. The wings are chestnut brown and grey, with white spots. The legs are covered with brown hair like feathers.

The female has the appearance of an ordinary game bird, her plumage being pale chestnut, mottled with black. Her tail is tipped with white.

When she becomes barren she often assumes more or less completely the plumage of the male.

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A specimen in the South Kensington Museum from Scotland exhibits much pencilled grey on the back and metallic green on the breast. The bill is hooked.

Another from Russia bears a closer resemblance to the male; the green on the breast, however, is but a narrow band and is mixed with chestnut. The plumage is lighter than that of the common capercaillie, being more like that of the race found on the Ural Mountains.

Millais describes (*Game Birds and Shooting Sketches*) a female very like a male save that the breast is purple instead of green.

Albinistic varieties of capercaillie are not uncommon in Sweden, but are rare in Scotland.

The tail is composed of eighteen feathers, as in the case of black game. The red grouse and the ptarmigan have each sixteen tail feathers. The capercaillie or capercailzie, which is often called the "cock of the woods," became extinct in the British Isles in the seventeenth century, probably owing to the destruction of the pine forests by the woodman's axe and fires. Rennie states (*Montagu's Ornithological Dictionary*): "It formerly frequented the fir woods of Ireland and Scotland, and was last seen in 1760 in the woods of Strathglass. It continued in Strathspey until 1745." There is some evidence that the bird did not become extinct in Ireland until about 1790. Pennant states that it existed in Wales in 1760.

In the winter of 1827-8 Lord Fife of Braemar tried to reintroduce it into Scotland from Sweden. He procured only a single pair. The hen died before the breeding season; the cock then mated with a barndoor fowl. Eggs were laid which yielded chicks; these hybrids however did not attain maturity. Another pair of capercaillies were brought over in 1829. The hen laid a number of eggs; as, however, she did not sit steadily, eight of them were placed under a farmyard hen. Only one hatched out, and the chick did not live long. In the following season the hen capercaillie laid more eggs which she incubated for five weeks, when it was discovered that they were addled. In May and June 1831 this wife of two cocks laid twelve eggs; she was permitted to sit on five of these, the remainder were placed under a barndoor hen. Two of the former and four of the

latter yielded chicks, two of which were reared, but they did not succeed in establishing themselves as wild birds

About the year 1836 Mr Llewellen Lloyd, the author of *Field Sports of Norway and Sweden*, presented to Mr Buxton of Norfolk a pair of capercaillies which bred six young birds, these latter died owing to exposure to the sun

Buxton then asked Lloyd to send him a number of birds from Sweden Sixteen hens and thirteen cocks were procured, these were forwarded to the Marquis of Breadalbane, as it was hoped that they would establish themselves in his extensive pine forests in Perthshire In 1838 the Marquis obtained a further supply of sixteen hens In the following year young birds were seen in the woods of Breadalbane

To ensure success several of the old birds were kept in confinement and their eggs placed under domestic fowls and grey hens None of the birds was shot for several years, but a few were poached and sold in poulterers' shops In 1862 the Marquis of Breadalbane estimated that his estate held over one thousand capercaillies They had fairly established themselves From that centre they gradually spread into the neighbouring counties

The Duke of Hamilton brought over from Breadalbane to Arran, in 1843, seven capercaillies, of which six were hens Three years later he procured eight hens and two cocks from Sweden These birds succeeded in establishing themselves The woods in the island are restricted it is said that they are not large enough to support more than about eighty of these large birds

On the Scottish mainland the capercaillie is now found in suitable localities in Perthshire, Inverness shire, Aberdeenshire, Elgin, Nairn, and Ross and Cromarty On the Continent it inhabits the pine forests of Scandinavia, Lapland, Northern Russia and Western Siberia, and occurs locally in the wooded parts of the Pyrenees, Alps, Carpathians, Altai and Urals The capercaillies living on the last-named mountains are of paler hue and are regarded as a sub species

During the winter the capercaillie subsists almost entirely on the leaves and shoots of pines In Scandinavia it has a predilection for the Scotch fir (*Pinus sylvestris*) In Scotland it is partial to the larch,

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which does not occur in Scandinavia. It will eat, but is not fond of, the leaves of the spruce pine.

In summer it enjoys a more varied diet, feeding largely on ferns, buds, alder, birch, hazel, acorns, cranberries, crowberries, bilberries, juniper berries, wild strawberries and raspberries.

As it is sometimes flushed from heather it probably eats the leaves of that plant. Like grouse and blackgame, it visits the stooks after the corn has been cut. A considerable portion of its food consists of insects. The young are fed entirely on these and ants' eggs. It is important to bear this in mind, because capercaillies, like blackgame, are said to injure pines by picking off the leading buds. Should the capercaillie become abundant in Scotland, it will be necessary to determine whether the damage it causes to pines is not outweighed by the good it does by devouring insects injurious to those trees.

The cock of the woods usually roosts in trees, but, according to Lloyd, in Sweden it burrows into deep snow and spends the night and sometimes great part of the day in the cavity thus made. Blackcock are said to behave in like manner, but they habitually roost on the ground.

The capercaillie is able to attain a speed of fifty miles in the air, nevertheless the beating of its great wings is barely audible. During flight it glides at intervals on spread pinions. It is an adept at threading its way among trees.

The capercaillie is an unusually timid bird. Despite its size and big beak, it is no match for even the smaller birds of prey. Although generally afraid of man, an old male has been known to attack a human being. There is in Lloyd's *Wild Sports of Norway and Sweden* a picture of a boy being set upon by a capercaillie.

When the hen is surprised with her brood she generally decamps, but at times shows fight.

The capercaillie does not thrive in confinement because of its nervousness.

Mr. W. H. St. Quintin, who has had great experience in keeping game birds, states (*Avicultural Magazine*, September 1912) that the adult wild-caught capercaillie is about the most difficult subject to

deal with that he has encountered. Not only not tolerate close
 confinement, but it must be given plenty of cover into which food
 must be thrown for some considerable time, otherwise it will starve
 to death in the midst of plenty, being too timid to venture into the
 open to pick it up. One old cock he had would not, for nearly three
 years, come out into the open to feed in presence of a human being.

The nuptial habits of the capercaillie are as difficult to observe as
 they are curious. Much that has been written about them seems to
 be based on surmise. A naturalist observes some of the activities,
 and, when giving account of the whole performance, finds it neces-
 sary to fill in the *lacunae*. In order to do this he questions the local
 inhabitants, who often draw upon their imagination, or repeat what
 they have heard others say. The account so compiled appears in
 print and is copied by subsequent writers, or paraphrased without
 acknowledgment, and eventually becomes accepted natural history.

As I have not witnessed the activities of the cock of the woods at
 the nuptial season, I am under the necessity of relying on the
 statements of those who have been more fortunate. These do not
 agree, and some appear to be a mixture of that which the observer
 has seen and that which he has been told. To sift the evidence is
 not easy.

Fights frequently occur among the males in the early spring.
 The birds are not armed with spurs, nevertheless there is little room
 for doubt that a contest sometimes ends fatally. The combatants
 spring at one another, after the manner of game cocks, strike with
 their wings, tear at one another with the claws and peck savagely
 at one another's combs. A severe peck causes the comb to bleed
 profusely. The blood, if it runs into the eyes, blinds the bird
 temporarily and places him at the mercy of his rival, who seizes
 him by the neck, shakes him violently, drags him about and finally
 pins him to the ground and punishes him.

A desire for exclusive possession of territory is probably the
casus belli. According to Mr F Wishaw each successful cock holds
 an extent of territory of which the diameter is about two hundred
 yards. Each spends the night in a tree in his holding. "At the first
 hunt of dawn," writes Wishaw (*Baily's Magazine*, 1892, p. 222),

" while it is still perfectly dark, they are all awake and alert, ready for the first challenge, which generally proceeds from the throat of the oldest and most experienced knight in the lists. No sooner has one bird sounded the first challenge, than, if it be a good *tok* (or tournament), the portion of the forest devoted to it becomes immediately alive with the sound of crowing, challenging, and singing from a score, or it may be a hundred, capercaillie throats."

Most of this is hearsay. Wishaw himself heard the birds calling and shot six of them, each in its tree. He is, however, incorrect when he speaks of a tournament. After the males have secured territory there does not seem to be any fighting. The statement that the oldest bird usually begins the calling is obviously based on the imagination.

The performance of the male while calling in his tree, or occasionally on a rock, is well known, because on the Continent the capercaillie is habitually stalked and shot while so engaged. It was thus that Wishaw bagged six cocks one morning. He says he could have obtained six more had he desired to do so.

What may be termed the love-song of the male, known as the *spel* in Sweden, is composed of three strange calls, each of which has been given a special name by the Swedes. The first is like the sound made by knocking together two sticks. Wishaw describes it as *tok-tokat*, others render it variously as *pellep*, *tut tut*, *klick-kleck*, repeated three times, with a short interval between each call. When uttering this part of the call, the bird is very alert and moves his head from side to side.

After a short interval the second call is uttered; this is not unlike the sound made when a cork is drawn out of a bottle of wine.

The third call, often called the *hede* note, is like the noise made by the sharpening of an edged tool on a whetstone, or the swish of a scythe cutting coarse grass. When uttering this, the capercaillie is in a state of frenzy. His expanded tail is erected and his quivering wings are drooped. Froth is said to issue from his mouth, and, for the time being, he seems neither to hear nor see, the orifice of the ear being apparently closed and the nictating membrane drawn over the eye. The whole series of sounds occupies nearly three

minutes. After an interval it is repeated. Continental sportsmen take advantage of the blindness and deafness of the bird while emitting the *hede* call to approach him. Having come within about fifty yards of the love-sick bird, the sportsman stands motionless until he hears the *hede* sound, then he takes three or four rapid steps towards the bird and again remains motionless until the *hede* call is repeated. By this means he is able to approach quite close, and he fires during the *hede* note. If he misses the bird it matters not, for it is deaf to the sound and remains perched. Wishaw thus describes his experience: "My bird kept at it bravely, and by dint of taking mighty jumps towards him at each opportunity—he never gave me time for more than five jumps during one song—I approached quite close, not more than fifteen yards from his tree. But it was too dark to see him, though I could distinguish a dark mass amid the branches. There was nothing for it. I must wait awhile. So I leaned against a tree and waited. Soon my eyes grew more accustomed to the darkness, and I determined to raise my gun and fire during the very next song. I did so. Down came the monster at my very feet, flapping his huge wings for a minute, but only for a minute, for Lajoo at the sound of the shot, had rushed up and fallen upon him and all was still again."

"To my astonishment I soon found that the sound of the report had in no way discouraged the other knights of the *tok*. They were still at it, hammer and tongs, as if nothing had happened. Elated with my success, I started off to stalk a second bird. Suffice it to say that in ten minutes I was at the foot of his tree, aiming at one of two dark masses among the branches, one of these was the bird, I knew, and the other probably a tangle of dead leaves, but it was too dark to ascertain which was which. I waited for the song and fired."

"No capercaillie fell, and I thought with a pang of regret that I had lost my chance, with this fellow, at all events, by firing at the wrong object, but to my intense surprise the bird immediately resumed its challenges, taking no notice whatever of my shot."

The calls of the male bird, which are repeated in quickening succession until they become continuous, probably attract one c

more hens. These fly to the tree in which the male is perched and alight either in it or on the ground near by uttering a croak which may be rendered *gock, gick, gock*.

A little before sunrise the male descends and joins the hens attracted by his calling. There he struts, neck-frill, wings, and tail erect; now and then he jumps into the air and makes a loud booming noise. Presently one of the hens stands beside him and they pair. It is said that the male pairs with each female in turn; that if, while they are disporting themselves on the ground, the cock is shot, the hens do not fly away but continue to call, so overcome are they by sexual emotion. It is further asserted that the old cocks do not allow the young ones to call!

"The cock," writes Bonner (*Forest Creatures*, p. 136), "is so extremely jealous that he will allow no rival in his neighbourhood. Nor will he permit a single one of his chosen fair to quit his court. The old bird is a despot and his jealousy grows with his age. He is a terror to all the young gallants around, and so long as he is unscathed, pairing time is for them a word without a meaning. Such an old cock 'keeps company,' in maid-servant phraseology, with a bevy of hens, and many of them have nothing more than his company; but they nevertheless are not permitted on that account to listen to a young wooer."

Much of the above is gossip of the country folk.

The males certainly do not willingly tolerate other males on their territory, but obviously they cannot prevent other cocks calling.

Probably a cock having once paired with a hen takes no further interest in her. It may well be that the same hen visits different cocks on different days. A cock perched in a tree is not in a position to force hens to come to him. Whether a hen keeps to any one cock could be ascertained only by very painstaking observation of marked birds. Mr. Edmund Selous's observations on ruffs reveal that the reeve does not always visit the same ruff, although rival cocks take up positions within a few inches of one another on the pairing ground.

It is asserted that the cock capercaillie keeps his harem of hens with him until their broods are grown up. This, on the face of it,

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is impossible. The nests are some distance apart, and the broods are not likely to be hatched simultaneously.

Mr J G Millais records (*The Natural History of Game Birds*, p 6) that in Scotland he has found nests and broods far from the usual capercaillie haunts, and where no males have ever been seen. This indicates that the hen may sometimes make her nest at a considerable distance from the pairing ground. Moreover, when the capercaillie extends its range in Scotland the females usually appear in a new district one or two years before the males. The fact that a blackcock often mates with a hen capercaillie shows that the cock capercaillie does not, or is not able to, prevent the females of his species from mating with blackcock, this being so, it is improbable that he prevents them from pairing with young capercaillies should they desire to do so. As species very unlike one another in appearance rarely pair, the frequent unions between the black grouse and the capercaillie indicate that there is something peculiar in their nuptial habits.

An account has already been given of the hybrid resulting from such a union (see p 36).

From the foregoing it is apparent that much remains to be discovered regarding the connubial affairs of the capercaillie. Until more is known of them it is of little use to speculate as to the significance of the behaviour of the cocks, or the benefit (if any) the species derives therefrom. The cock takes no part in nest-making, nidification or care of the young.

The nest is a scrape in the ground lined with pine needles. It is usually under a tree or bush, sometimes in a tunnel made by the hen in an ant-heap. Millais writes (*loc cit*, p 13) "I have known of three cases, all in Perthshire, where female capercaillie have made nests in trees ten to fifteen feet above the ground, and have successfully hatched out broods." He gives no details regarding these unusual nests.

Capercaillies in Scotland occasionally lay eggs in the nests of pheasants. The average number of eggs in the clutch is about seven, as few as five and as many as fifteen have been found.

It is said that by removing an egg every other day leaving always

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some eggs in the nest, the hen may be induced to lay as many as twenty.

The eggs are about two inches long and one and a half broad. They are sullied yellow, with dark spots or blotches. Incubation occupies about a month.

Lloyd tells a story of a bed-ridden man in Sweden hatching some eggs of the capercaillie by lying on them! In India it is said to be a common practice for men to carry in their loin-cloths eggs of the water cock, their bellies providing the heat for these unusual incubators!

The hen is not so close a sitter as the grouse, and it is said that on leaving the nest she often fails to cover the eggs. The young, when they emerge from the shell, are covered with mottled buff and brown down.

The enemies of the chicks are those of young grouse.

The hen is not an intelligent mother; in consequence the mortality among the broods is great.

Mr. W. R. Ogilvie Grant records (*The Gun at Home and Abroad*, p. 7) that a hen capercaillie, who had laid twelve eggs, went off with seven chicks, leaving in the nest five nearly-hatched eggs. These were placed under a domestic hen and yielded young. The hen was followed; when she was overtaken she was accompanied by but one chick, who might well have been the heroine of Wordsworth's poem "We are Seven." The six brethren were subsequently found in various drains into which they had fallen.

Capercaillie chicks seem to be very delicate. We have noticed that those hatched in Norfolk died as the result of exposure to the sun.

"The forest keepers," writes Mr. M. Cuninghame (*Avicultural Magazine*, June 1913, p. 237), "have (in Siberia) several times brought the young birds to me before they could fly, and then I never had any trouble with them. Their food at first was hemp and canary seed, and, when they got bigger, wheat, barley and oats, also any wild berries or green food, and occasionally the ordinary water melon. They became quite tame in a very short time, and used to wander about among the domestic hens. We found, however, that we could not keep more than one cock, even if only a few

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months old, owing to their continual fighting. They showed no signs of wishing to fly away, though unpinioned, and seemed quite happy.

"In spite of everything I could do, I have never been able to bring any of my birds through a winter. The cold is intense, ^{say-}ing from twenty to forty degrees below zero, and when turning them out they got their feet frost bitten, and then rapidly collapsed, but exercise of some sort they must have. In their wild state in the winter I have never seen one of these birds on the ground."

Mr. St. Quintin, in England, succeeded once in rearing two females, but he has had many failures. "Of all the young birds," he writes (*Avicultural Magazine*, March 1909, p. 147), "that I have had anything to do with, capercaillies are the most tender and difficult."

Birds of strange form are usually believed by the ignorant to possess medicinal properties. The tongue of the capercaillie is supposed by the credulous in Germany to be a preservative against the pains of dentition; in consequence it is often sewn up in a little bag and hung round the neck of an infant.

CHAPTER XIII

THE COMMON SNIPE

THE common snipe (*Gallinago coelestis*) is often called the full snipe in order to distinguish it from the jack snipe, and the fantail snipe in contradistinction to an allied species, not found in Great Britain, known as the pintail snipe.

The common snipe differs in an important respect from the game birds we have been considering in that it is highly specialised.

The members of the snipe family are not content to pick up food they find on the surface of the earth, as pheasants and partridges are. They have discovered that under ground are numbers of worms and other creatures which are most nourishing: on these they subsist.

Even as the giraffe, owing to its long neck, is able to browse on herbage inaccessible to all other four-legged creatures, so some members of the snipe family are able, by means of the long bill, to procure underground food which is beyond the reach of most birds.

The bill of the snipe is a wonderful instrument. It is probe and forceps combined. Nearly three inches in length, it is out of all proportion to the size of its owner. The upper chap or mandible is longer than the lower and grooved below, so that the latter fits into it as the blade of a penknife fits into the cleft handle. It is soft, and pliable and swollen at the far end. The swollen portion is pitted all over. This pitting is easily seen in the cooked bird. As each pit contains a nerve, the snipe's bill is highly sensitive—as sensitive as the tip of a man's finger. Thus when the snipe plunges its bill into the mud it is able to feel and seize every worm or other edible creature with which it comes in contact.

Snipe feed on worms, water-snails, beetles and other insects; occasionally they eat seeds. Grit and small pebbles are usually found in the gizzard; these assist in the grinding of the food preparatory

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to digesting it The snipe has an enormous appetite and digests its food very rapidly A worm is said to be dissolved within ten minutes of entering the stomach

As the snipe subsists largely on creatures that live buried in mud, it has to rely mainly on its sense of hearing and touch to locate its quarry Mr H Wormald records that a snipe reared by him was able by touch to distinguish between raw liver which it disliked and worms of which it was fond Its hearing was very acute, it used, with head on one side, to listen for worms as a thrush does on the lawn

The extremity of the upper mandible of the bill can be moved independently of the other part, thus the snipe is able, without opening its jaws, to grip a creature buried in mud

A long billed bird, having seized a morsel of food, has to adopt some means of getting this into its gullet One method is to toss the food into the air and catch it in the gullet Hornbills are adepts at this The snipe performs no such juggling feat Sportsmen commonly assert that it feeds by suction, this is why they eat the trail They may be right as to the suction, but I doubt whether many of them realise that the trail consists largely of mud, grit and partially-digested worms! Snipe, I imagine, use the sensitive mobile mandibles and the tongue to draw into the gullet a worm that has been seized At any rate, the operation is sometimes performed while the bill is buried in the mud I have shot many a snipe having the bill coated with mud up to the feathering of the head, but have never witnessed one of them plunge its bill into the slime, as, according to my experience, they feed in cover during the day Mr F W Frohawk, however, has repeatedly seen snipe feeding in the open during daylight Such sights are not vouchsafed to everyone By taking up a position before dawn on ground where snipe are known to feed they may sometimes be seen at breakfast I know of two people who have adopted this method with success One was a planter in India, who was a bad shot His friends, when they breakfasted with him in winter, expected to find snipe on the table In order to gratify them he resorted to the neighbouring bog before dawn, and, by putting himself between the snipe and the rising sun, he was able to shoot them while they were feeding

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The other observer was the late Fergus Monteith Ogilvie. I take the liberty of reproducing his account of what he saw (*Field Observations on British Birds*): "Before I had been in position long, I heard a sudden whizz in the air, and a snipe dropped down on to the mud within eight or ten yards of me.

"Entirely unconscious of my proximity, he started feeding unconcernedly at the edge of the water. His movements were slow and stately as he methodically probed the mud with his long bill, in marked contrast to the nervous, jerky style of the feeding sandpiper. Sometimes he would bury the bill only half its length, at others plunge it into the ooze right up to the frontal feathers, the bill slanting slightly away from him, so that it made an angle of seventy-five or eighty degrees with the ground.

"Now and again he would withdraw the bill quickly, when, I supposed, he had found nothing. On other occasions, he would thrust the bill well into the mud, and hold it motionless for a second or two—then push it in a little further with a powerful kick of his feet, as though there was something just out of his reach.

"He found food, I imagine, in these latter instances; seized and swallowed it without removing his bill from the mud in which it was embedded. At any rate he never brought anything up to the surface and ate it; any food he obtained must have been ingested with his bill buried deep in the mud."

It should be mentioned that Ogilvie was smoking his pipe when the snipe alighted near him. Birds appear to lack the sense of smell.

Disadvantages usually attend specialisation. A *sine qua non* of the snipe's existence is ground so soft that the delicate, pliable bill can be thrust deep into it. The bird can live only in boggy country. Ireland is a paradise for snipe. In hard winters, when the marshes, bogs and streams become frozen, the snipe suffer greatly; they become very thin. If the frost be prolonged they must migrate or starve.

Another adaptation of the snipe and its relatives to their method of feeding is the position of the eyes. These are set far back in the head, directly above the ears, instead of in front of them as in most birds. This arrangement enables the snipe to keep a look-out while

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its bill is buried in mud, even as the backward position of the eyes enables herbivora, while grazing, to see what is going on around them. The large size of the eyes of the snipe is characteristic of nocturnal birds.

As in the case of most game birds, the plumage of the snipe, without being showy, displays a very complicated pattern. A full description would be equally tedious to writer and reader, fortunately this is not necessary, for there is no bird in England with which the common snipe can be confounded.

I may, however, invite attention to the longitudinal streaks on the head and back. Such streaks are characteristic of the various species of snipe and quail and the American starlings, known as meadow larks (*Sturnella*). These are all ground birds which, in presence of danger, squat in preference to taking wing. This striping probably renders them difficult to see from above among withered vegetation. It may therefore be protective. But as snipe feed chiefly by night and spend the day in cover, they do not seem to be in need of such protection. It may be that snipe are more diurnal than is generally supposed.

Snipe vary greatly in size. The weight of a medium sized bird is a trifle over 4 oz. The Rev M. C. Bird found the average of 1,679 specimens to be 4 15 oz., but snipe in poor condition weigh considerably less, on the other hand, individuals have been shot that turn the scale at 7½ oz. The weight seems to be largely a matter of feeding. Snipe in England are usually in best condition in November and December, after that they dissipate their energy in aerial antics and nesting, and, according to Miss A. C. Jackson, in moulting. She asserts that they undergo a partial moult between January and May and a complete moult in the autumn. For reasons already given (see Chap. III) it is open to query whether the snipe "moults" any of its feathers twice in the year.

Measurements made by Miss Jackson show that the wings and tail of the female are on the average a little longer than those of the male.

As in the case of the pheasant and the partridge, sports not infrequently occur among snipe.

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The great majority of the common snipe have fourteen feathers in the tail, but now and again a specimen is shot having sixteen. Probably these sixteen-feather-tailed birds are more common than is generally supposed.

Sportsmen who are interested in the subject should make a point of counting the feathers in the tail of every snipe they shoot and make notes of the result. I venture to say that the editor of *British Birds* or of *The Scottish Naturalist* or of *The Irish Naturalist* would be glad to publish the results of such examinations. It may here be said that the tail of the jack snipe invariably consists of twelve feathers.

Mention must be made of an unusually large form of which the plumage is redder than that of the ordinary snipe. At one time this was deemed to be a different species, and was called the russet snipe—*Scolopax russata*. It, however, appears to be merely a reddish common snipe.

There is a dark brown variety, cross-barred, but displaying no pale streaks in the plumage. This was formerly regarded as a different species (some still consider it to be) and called Sabine's snipe (*S. sabini*). It is now deemed a melanistic form. Specimens intermediate in appearance between the dark and the normal one have been shot. This sport crops out most frequently in Ireland, is fairly common in England, but not in Scotland. There is a doubtful record of a specimen being shot on the continent of Europe and one in India.

It may here be mentioned that a damp climate tends to cause the plumage of birds to become dark, and a dry one to have the reverse effect.

It may be that the comparative abundance of the dark form in Ireland is due to the moist climate.

Cream-coloured, white and pied snipe occasionally appear as sports. In 1908 Captain B. Young shot, near Salisbury, a variety containing much cream, white, and chestnut in the plumage. A description of this is given in *The Field*, November 3rd, 1927.

That the more conspicuous forms—the cream, white and pied—have not succeeded in establishing themselves as races may be because their showy plumage renders them very liable to fall victims

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to birds of prey This, however, cannot be said of Sabine's snipe The failure of this to establish itself is probably due to one, or both, of two causes Its colouring may be correlated to physical weakness The correlation or interdependence of two or more characteristics attracted Darwin's attention In his *Origin of Species* he cites some curious examples, such as the association of deafness with blue eyes in cats Later naturalists have paid but scant attention to a phenomenon which may give the clue to some of the problems presented by the coloration of birds

Another reason why these sports have not become established as races is that they seem to occur rarely, so that, if they breed, they have to mate with normal forms, and this is true of their offspring, thus the colour variation is bred out in a few generations

As regards the rarity of these abnormal forms, Mr F W Frohawk writes (*Field*, November 3rd, 1927) that Mr P Halloran, who has shot over 40,000 snipe, has brought to bag only one of abnormal colouring—a greyish-white bird

This figure, however, may not reveal the true state of affairs It may be that the showy varieties have learned by experience that they are chased by birds of prey when they are on the wing, and so they may be more loath to take to their wings in presence of danger than are snipe of normal plumage In India pale forms of snipe are rarely shot by sportsmen, nevertheless they occur not infrequently among birds that have been netted

Snipe are to be found at all seasons of the year in the British Isles, and they breed in our country They are far more abundant in winter than in summer, there being a great influx in the autumn and an exodus in the spring

"I have known," writes Mr L H De V Shaw (*The Snipe and Woodcock*, p 23), "snipe come over the north Norfolk coast for a continuous period of three hours, all the birds taking the same line and the majority of them flying singly"

It may be remarked that such a sight is unusual, as most snipe migrate by night It is not difficult to understand why these birds come to our country in such numbers in the autumn Doubtless they have been hatched in Iceland, the Faroes, Scandinavia and

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possibly Siberia, Russia and the central parts of Europe, where the marshes they frequent become frozen in autumn.

Thus the question arises, are there two races of snipe—a resident and a migratory one?

Ogilvie maintained that there are not. He asserted that the snipe which nest in the British Isles in summer go south in the autumn and are replaced by a larger body that comes in from other parts of Europe.

He was led to form this opinion as the result of keeping watch over an area in Suffolk frequented by snipe, on which he estimated 100 pairs nested. As the clutch consists of four eggs, the snipe population of the area after the breeding season should be some 600, apart from casualties; or, allowing for these, about 400.

At the end of July the area appeared to hold about this number. In September, however, nearly all the snipe had disappeared. In October, November and December they were numerous.

The above observations show that snipe move about, but they do not prove that those which nest in the British Isles winter abroad.

The recent practice of marking nestlings by placing rings on the legs has resulted in interesting discoveries regarding migration. The ringing of young snipe has proved that Ogilvie was mistaken, that some, at any rate, of the snipe bred in the British Isles winter with us.

The following table has been compiled from the recoveries of ringed snipe recorded in *British Birds*:

<i>Date on which snipe nestling was ringed.</i>	<i>Locality.</i>	<i>Date on which bird was shot.</i>	<i>Locality.</i>
May 21st, 1911	East Cheshire Hills	Nov. 18th, 1911	Stoke-on-Trent
June 3rd, 1911	East Cheshire Hills	Aug. 23rd, 1913	Huddersfield
May 10th, 1912	East Cheshire Hills	Aug. 27th, 1914	Disley, Cheshire
May 16th, 1912	East Cheshire Hills	Dec. 29th, 1913	County Cork
June 4th, 1912	East Cheshire Hills	Aug. 13th, 1912	Northallerton, Yorks.
May 2nd, 1912	Bedfordshire	Nov. 7th, 1913	Norfolk
May 13th, 1914	Elstead, Surrey	Jan. 11th, 1916	Steyning, Sussex
April 29th, 1915	Newbury, Berks.	Feb. 23rd, 1916	Whitchurch, Hants
July 4th, 1913	Cheadle, Stafford- shire	Nov. 29th, 1916	Stoke-on-Trent

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<i>Date on which snipe nestling was ringed</i>	<i>Locality</i>	<i>Date on which bird was shot</i>	<i>Locality</i>
May 24th, 1921	Lancashire	Dec 30th, 1921	Lanca
May 14th, 1916	Leeds	Sept 5th, 1921	Leeds
May 16th, 1917	Shropshire	Nov 8th, 1920	Denbighshire
May 23rd, 1922	Dumfriesshire	Dec 8th, 1922	Armagh

The above table shows (1) that some snipe bred in the British Isles remain in the country throughout the year (2) Such resident birds move about in the British Isles (3) These local movements are irregular, i.e. not all in one direction, thus of two snipe ringed in Cheshire in 1912, one was subsequently recovered in Yorkshire and the other in Cork.

The apparently irregular movements of snipe are easily accounted for. They are connected with food supply. This movement of snipe is very noticeable in India. One day a marsh will be well stocked with birds, a week later it will be devoid of them. The reason of the departure of the snipe in most cases is that the marsh has dried up owing to evaporation and the water being used for irrigation.

Writing of the Scottish Highlands, St John says "Particular ditches near my house always afford me two or three snipes. As fast as I kill them others appear." There must be a period, longer or shorter according to circumstances, when every feeding ground is at its best from the point of view of the snipe, neither too wet nor too dry. Every heavy fall of rain must affect its condition, probably as soon as it becomes too dry or holds too much water the snipe seek other grounds, dispersing in all directions to do so. When a snipe, while searching for food, comes upon a good but not overcrowded bog, it probably alights on it, and stays there to feed so long as it affords abundant food.

From the fact that the above table shows no nestlings ringed in England as recovered abroad, it does not follow that snipe bred in the British Isles never leave them. It may be that some of the nestlings ringed in this country migrated abroad and either were not shot or the shooting of them was not recorded.

The great majority of snipe are migratory. The birds are exceedingly abundant in India in the cold weather, but from May to

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August you may search the whole of that great country without finding a snipe. Here and there, perhaps, you may come upon a stray bird or a pair, which owing to wounds has not been able to undertake the long migratory journey. In such circumstances a few may nest in India, but practically the whole of the millions of snipe which frequent the marshes of the plains go in the spring to Kashmir or farther afield to breed. The same is true of the birds that winter in Northern Africa and the Azores.

In the present state of our knowledge it is not possible to answer the question: Do any of the snipe that winter in Africa nest in the British Isles? The future ringing of snipe in Africa may one day enable us to reply to the question.

Every sportsman who shoots a ringed snipe should make a point of sending the ring, with particulars of the date and place at which the bird was shot, to the Editor of *British Birds*, 326 High Holborn, London, W.C.2.

When not engaged in nesting snipe seem to sleep for the greater part of the day, often on dry ground in cover. Their habit is to squat with the bill tucked into the shoulder after the manner of ducks.

Provided their feeding grounds afford sufficient cover, they spend the day on these, but cover is essential. In India I have put up snipe in numbers from a reedy swamp where the water came half-way up my thighs; they were probably sleeping at spots where the rushes were sufficiently matted to afford places on which they could squat. Possibly they perch on rushes. Not uncommonly in that country they spend the day on the curled-up withered lotus-leaves which float on water four or five feet deep. They are sometimes flushed in numbers from fields of corn, sugar-cane and other crops. In India they need protection from the rays of the sun as well as from birds of prey. Snipe certainly do not roost in coveys as partridges do. Most often when the sportsman puts them up they rise singly. Sometimes a wisp is flushed. I take this to mean that several have taken up positions for the day in some well-covered, dry patch.

According to my experience in India snipe lie much closer in the middle of the day than in the early morning. This probably means

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that usually they do not sleep before the sun is well up, and until then they rise while the intruder is at some distance, later, when they are asleep they are not aware of his approach until he is close upon them. The fact that they are so "wild" in England in stormy weather may be due to their not sleeping well under such conditions.

When flushed, the common snipe almost invariably utters what seems to be a cry of alarm. This is usually syllabised as "sceap," "psisp," or "pench." To my ears the note sounds like a sharp, low quack. The peculiar note is as easy to recognise as it is difficult to describe. As the jack snipe rises silently, the presence or absence of the alarm call usually enables the sportsman in England to identify the species the moment a snipe shows itself.

It should be mentioned that this cry of alarm is not made when a snipe is flushed off the nest.

During the greater part of the year the snipe is a silent bird. It calls only on rare occasions and never willingly exposes itself to view. In the spring it becomes most vociferous, seems to lose nearly all its fear of man and to delight in rendering itself conspicuous by making a noise, performing aerial evolutions and sitting on exposed perches, often pitching quite close to a human being. From March to June the snipe, especially the male, frequently emits a monotonous double call, which, like most of the cries of birds, cannot be satisfactorily reduced to human syllables. The various attempts to express the snipe's call present a strange collection of words. One observer declares the bird calls *juck-zack*, another *chook-chook*, the third *zoo-zee*, a fourth *keet-koot*, a fifth *chack-wood*, and so on, almost *ad infinitum*.

In addition to this rising and falling double note, the snipe at this season emits a sound which is described as "drumming" by some, "neighing" by others, and "bleating" by most. Nearly all the local names for the snipe in the countries where it breeds have reference to this peculiar sound: "sky goat," "flying goat," "goat of the air," "kid of the air," "horse cuckoo," "neighing cuckoo," "sheep of the marshes," "sky ram."

This "bleating" is heard only when the snipe is performing the aerial evolutions to which it is addicted during the breeding season.

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The bird rises from the ground and mounts rapidly; when it has risen to a height of from 70 to 100 feet, it suddenly turns and swoops downwards at an angle of about 50° , with wings half closed but vibrating rapidly, and tail fully expanded and erected. The bleat is heard only during the descent, and is loudest when the motion is most rapid. Before reaching the ground the snipe usually turns and again rises. These manœuvres may continue for an hour before the bird settles.

How the "bleating" is made has been, and still is, a matter of hot discussion. Many observers have spent days, nay, weeks, watching the bird in order to discover the cause of this bleating, and, as the result of all this observation, a few are convinced that the sound is vocal; others that it is produced by the tail. Some believe that the wings cause it, while many are of opinion that both wings and tail contribute to it.

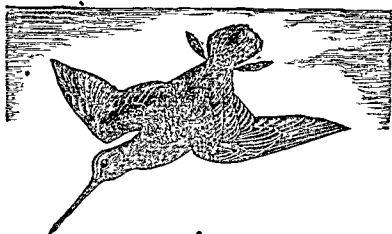
The vocal theory has not many adherents to-day, because the sound is never emitted when the snipe is perched or making its upward flight. Ogilvie asserts that on one occasion he heard a snipe "bleating" at the same time as it uttered its *jick-zack* call. A few other observers—very few—have made the same observation. If this be so, the vocal theory must be rejected. But possibly the observers really heard two birds. Those who live in localities where snipe breed may be in a position to confirm the observation.

There can be no doubt that the tail plays some part in the production of the bleating of the snipe. As Meves pointed out more than seventy years ago, the outer pair of tail feathers is of peculiar formation. Each has a stiff sabre-shaped shaft with oblique barbs of unusual length, the outer webs of these being strongly bound together. He found that by blowing violently on these feathers, or by waving them rapidly through the air when fastened to a stick, he could reproduce the bleating sound. Dr. E. H. Bahr, more recently, reproduced the sound by similar means. His experiments are recorded in the *Proceedings of the Zoological Society* for 1907 (pp. 12-35).

He, Mr. A. Thorburn and Mr. Edmund Selous have all pointed out that when the snipe descends, with wings aquiver, the outer-

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most pair of tail feathers projects at right angles to the median line of the bird's body, so as to look like curved tufts a little above the tail proper. The position of these feathers is well shown in Mr. Daglish's picture of a "drumming" snipe. Bahr, by using a strong glass, was able to see these two feathers vibrating so rapidly during the descent that their tips were blurred. Further, the snipe never "bleats" unless its tail is expanded.



On the other hand, the jack snipe, which also makes a curious sound that has been compared with the sound of the hoofs of a horse cantering on a hard road, has not these peculiar tail feathers. Moreover, in order to produce the bleating of the common snipe artificially, the mounted tail feathers have to be moved with far greater speed than the snipe ever attains, and even then the sound is neither so loud nor so far-reaching. Further, the "bleating" is not heard, no matter how rapidly the snipe descends, unless its wings are quivering. It would therefore seem that the wings assist in the production of the sound, that the half-closed, vibrating pinions force the air violently on to the stiff outer tail-feathers, and this, combined with the rush of air owing to the motion of the bird, gives rise to the sound.

What is the meaning of all these aerobatics? Do they serve any useful purpose? Some assert that the "tail-music" of the snipe is

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attractive to the female. I do not believe this. In my opinion all the aerial evolutions of the snipe are merely an expression of the bird's *joie de vivre*.

Reproduction makes great demands on the energy of birds. Between two nesting seasons they seem to be storing up energy to carry them through the breeding period. A time comes when the bird is almost bursting with energy: it is then so brimful of this that it has enough and to spare and dissipates much of it in joyous song, dance and fantastic flights.

He who walks the meads with eyes open, and is not obsessed by the idea that the mind of a bird is like that of a human being, cannot fail to be impressed by the joyousness of the fowls of the air, especially in spring.

Grievously mistaken are those humans who believe that birds spend their lives in a state of terror, that they live in expectation of death at every moment, that when they go to roost they wonder whether they will be alive when the sun rises. Birds cannot know what death is. The life of the bird is far happier than that of the average human being. The chief causes of human suffering are ill-health, worry, an uneasy conscience, and *ennui*. Birds suffer from none of these ills. They enjoy robust health, they are care-free, they take no thought for the morrow, their time is fully occupied, and all their occupations give them pleasure. Nesting is not an unpleasant task; it is an exquisite amusement. A bird delights to make a nest as a well-trained athlete delights to run a race. The sorrows birds experience are as fleeting as an April shower. The bird whose eggs or young are destroyed is sorry for a little while, as is a child when a toy is broken, but the grief in each case is short-lived; within a few hours of the disaster the bird is singing blithely and setting to work on a new nest. The fear of enemies displayed by birds is instinctive, unreasoning. They are alarmed for a moment, without knowing why, at the sight of a bird of prey, but the alarm is forgotten by the time the enemy has passed out of sight. Some people believe that the hunted animal positively enjoys the first part of the chase; it experiences a feeling of exhilaration in fleeing from something which it vaguely fears. The pleasure ceases when it grows

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exhausted, but then the end is near. Death usually comes suddenly and speedily to birds. It most often overtakes them before they are fully adult or when they are just past the prime of life. There is no long lingering illness or slow progress to the grave among the fowls of the air.

Besides these up-and-down flights accompanied by 'bleating,' snipe at the nesting season and also in other curious movements, too numerous to detail. I may, however, mention one very strange exhibition recorded by Ogilvie. A snipe was just finishing its bleating downward flight when another appeared. The first bird, who was at the time about eighty feet from the ground, now "fully opened his wings, and raised them over his back with his legs extended, as though about to alight in mid-air. In this manner he floated gently downwards, then he turned over first on one side and then on the other, making his line of flight at right angles to the earth, resuming after each turn the old position of walking on the air. When he was within fifteen yards of the ground he turned right over, so that his breast was directed towards the sky, and his back to the ground. He then made a sudden recovery, and flew upwards, again to resume his drumming flight."

In addition to their aerial performances, snipe display on the ground, strutting about with drooping wings and expanded tail.

In late March or early April a nest is made. This is a shallow depression scraped in the ground and lined with herbage. It is generally situated in a marsh, often in a clump of rushes. Four eggs are usually laid, rarely three, and even more rarely five. The clutch of four is common to the Charadriidae, to which family the snipes, woodcocks, plovers, lapwings, phalaropes and a great many other birds belong.

Why some families should lay a small and constant number of eggs while others produce large and variable clutches is a riddle which has not yet been fully solved. No one has given a complete answer to the question why the snipes and the woodcock lay only four eggs in the clutch while most game birds lay large and very variable clutches.

The eggs of the snipe are certainly very big for the size of the

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bird; each weighs over $\frac{1}{2}$ oz., while the bird itself scales but little over $4\frac{1}{2}$ oz. The snipe could not cover more than four eggs; indeed it could not incubate so many were these not shaped like peg-tops and placed in the nest so that the pointed ends touch and the eggs fit like the pieces of a puzzle.

Apparently the snipe, unlike pheasants and partridges, cannot be induced to lay extra eggs by removing one occasionally, for the marshmen who collect plovers' eggs for sale, when they find an incomplete clutch, replace these by a dummy egg to induce the bird to complete the laying in the nest; but I have never heard it said that the number laid is thereby increased. If the completed clutch is taken a second batch seems usually to be laid, but this is often of less than four eggs. The largeness of the snipe's egg explains the small size of the clutch, but this is no solution of the problem which now resolves itself into: why does the snipe lay comparatively a much larger egg than the pheasant or the partridge, although the young are not so well developed when they leave it?

The snipe, being a migratory bird, is able to seek breeding grounds where foes are less abundant than they are in more temperate climes, moreover it nests in marshes; in consequence the eggs probably suffer less destruction than those of non-migratory birds that lay on the ground in dry places. But some of the ducks are migratory, breed in the far north and nest in marshes, yet these lay large clutches. What is the necessity? It may be urged that the eggs of the duck do not harmonise with the hues of their surroundings as those of the snipe do, but this disadvantage must be largely counterbalanced by the fact that ducks cover their eggs with down when they leave the nest.

The answer to the question may be that baby snipe, owing to the fact that they feed in marshy places, are less liable to disaster than are the young of other ground-laying birds. As we have seen, many young partridges are lost because their feet become clogged with clay. Numbers of ducklings are drowned because the mother bird often takes them long distances on the water, during which many of them become exhausted and drown. The snipe nestlings are not subjected to either of these risks; some perish, however, in times of flood.

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Further, in their marshy surroundings they are less liable to attack by four footed foes than are baby partridges and pheasants

As I have shown in *Indian Bird Life*, the mortality among birds in consequence of the struggle for existence is largely among nestlings. These are the weakest link which is the measure of the strength of the vital chain which we call a species.

Thus the weakest link in the chain of the snipe's existence is comparatively strong. Moreover, as snipe are largely nocturnal and lie up in cover during the day, they are comparatively immune from the attacks of the diurnal raptors. Why, then, are snipe not more abundant?

We have not sufficient knowledge of the conditions under which they live to answer this question completely. The nature of the struggle for existence among animals is a subject to which naturalists have paid little attention. In the above mentioned work I have dealt with some aspects of this struggle in India. So far as I am aware no one has attempted anything of the kind in the case of the birds of any other country.

The chief checks on the growth of the snipe population appear to be

(1) Some birds of prey probably lay themselves out to catch snipe. Audubon says that the goshawk is an adept at taking them on the wing. Although snipe feed mainly at night, they also seek food by day, and their habit of squatting in presence of danger may lead to many falling victims to harriers and other raptors that fly low when looking for quarry.

(2) Apparently snipe are unable to endure great heat, at any rate they nest in no hot country.

(3) As we have noticed, their specialised feeding habits render them unable to exist anywhere but in marshy country. When the marshes become frozen they cannot obtain food, hence they have to migrate in winter from their more northerly breeding grounds, and when the bogs become frozen in the places where they winter, many starve to death or become too weak to breed in the following spring.

(4) Great numbers are shot and netted by man.

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by Mr W K Dods, who has on six other occasions shot more than 200 of the long-bills in a day

Mr Orr, who used to shoot on the paddy (rice) fields near Madras once a week throughout the winter, considered that he had had indifferent sport if he did not bring home fifty couple of snipe

In the British Isles, Mr Cobbold shot 151 snipe in the Hebrides, on January 30th, 1915 Mr Cornish is reported (*Game Bags and Game Records*) to have killed 96 snipe with 100 cartridges This feat seems to negative the assertion that snipe are more difficult to shoot in the British Isles than in India Nevertheless, speaking generally, this is so In India most of the *jhuls* (marshes) and the paddy fields afford good cover, and in consequence the snipe pass the day in them, and, as we have noticed, lie well when the sun is high For this reason it is best not to begin to shoot snipe early in the day in India This is not the case in England "In snipe shooting," writes Mr L H De V Shaw (*Snipe and Woodcock*, p 95), "one cannot be too early at work after it is light enough to sight a bird Before the first two hours of daylight are over, very frequently indeed before the first hour, the large majority of the birds—unless the night should have been dark and frosty, in which case they will still be intent on seeking food—leave their feeding grounds and scatter themselves over the higher country From two hours to an hour before dark they begin to return to their feeding grounds"

In India, where the cover afforded by the marsh or paddy is poor, the snipe behave as they do in the British Isles

Mr E C Stuart Baker describes how one day when shooting in paddy in Bengal the firing was continuous from 7 to 9 30 a m, when suddenly the snipe ceased to rise Between 10 and 4 the party fired scarcely half a dozen shots After 4 p m some twenty couple of birds were bagged A few days later Mr Baker went over the ground again and then discovered that at about 10 a m all the snipe left the paddy and retired to jute and other high crops near by

The seductiveness of snipe-shooting, as Mr Shand says, doubtless lies in the elusiveness of the bird and in his frolicsome flight, which often enables him, after getting up at one's feet, to slip

unscathed through two charges of number eight, although by his cry he gives warning that he is on the wing!

There has been much discussion as to whether it is best to fire immediately a snipe rises or wait until he has ceased to twist in the air. Most good shots adopt the latter course; a few, including Mr. Cornish mentioned above, advocate the former.

To those who would become proficient in the art of circumventing the snipe, I commend the little volume entitled *Snipe and Woodcock*—one of the "Fur and Feather Series" of sporting handbooks.

Mention may here be made of a species of snipe sometimes met with in England, known as the great or solitary snipe (*Gallinago major*). It breeds in Scandinavia, Finland, Holland, Denmark and Russia. In winter it migrates southwards and has been found as far afield as Natal. It is distinguishable at a glance from the common snipe by the following characteristics: its large size (it measures 16 inches, of which the bill accounts for 4); its tail is composed of 16 feathers; the lower parts of the outer tail feathers are white; the whole of its lower plumage is barred.

It offers an easy target when flushed. It is very rare in England. Most of the birds reported to be of this species are unusually large specimens of the common snipe.

Those interested in its habits are referred to Dresser's *Birds of Europe*, vol. vii, p. 635, and *The Ibis* for 1861, p. 87.

CHAPTER XIV

THE JACK SNIPE

THE jack snipe, or judcock, which is sometimes called the half-snipie in contradistinction to the full snipe, is easily distinguished by its smaller size. It measures about $8\frac{1}{2}$ inches from tail-tip to bill-tip, against the $10\frac{1}{2}$ of the common species. Its bill is about $1\frac{1}{2}$ inches in length, that is to say, about an inch shorter than that of the full snipe. The average weight of the latter is, as has been noted, 4.15 oz., that of the jack snipe is 2.24 oz., at least this is the figure obtained by the Rev. M. C. Bird as the result of weighing 328 specimens.

The plumage of the jack snipe is very like that of its larger cousin both in colouring and pattern. There is, however, this difference: the head of the common snipe is black with a broad median buff band and a narrow whitish band above each eye; the jack snipe lacks the median band, and the side ones are broader and are buff.

The tail is composed of twelve feathers. According to Miss A. C. Jackson, the wings of the average female jack snipe are, on the average, shorter than those of the male.

What has been said regarding the structure of the bill and the method of feeding of the full snipe applies to the small bird. Its shorter bill must place it at a disadvantage as compared with the common snipe in probing for its quarry; but, by way of compensation, its diet is more varied. The full snipe rarely eats seeds and the like, whereas the half-snipie habitually adds these to its animal food; in consequence it suffers less when the bogs and marshes are frozen. It is often quite plump when the common snipe is in miserable condition. Nevertheless the larger species is the more successful in the struggle for existence. Although both kinds of snipe are to be found on most large bogs, the full snipe almost invariably preponderate.

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of the speed on the wing of the one and an underestimate of that of the other. The difference in their flight is that of style rather than pace. The flight of the jack snipe is more feeble, more fluttering. The bird moves in a vacillating manner, as if it were hesitating whether or not to alight. When flushed it rarely travels far, after a few rapid wing-beats it drops suddenly, or shoots upwards and then falls like a stone. This sudden fall sometimes deceives a sportsman into believing he has killed the bird, and he is much surprised when, as he goes to pick it up, it rises almost from under his feet.

Although it lacks some of the pace of the full snipe, the jack when fairly on the wing is usually able to elude a bird of prey. Writing of India, Mr W. Jesse says (*Ibis*, April 1903) 'On one occasion I saw a jack snipe being hawked by a pair of falcons (*F. jugger*), two kites, a tawny eagle, and two more raptorial birds, all of which the snipe finally eluded.'

The jack snipe feeds both by day and night. Miss E. L. Turner watched (*British Birds*, vol. ix, p. 285) one feeding daily from 11 a.m. to about 3 p.m. When she came upon it one day at 11 a.m. it was asleep on a stone on its feeding ground.

The nesting range of the jack snipe is not so extensive as that of the full snipe. The smaller species does not usually breed in the British Isles. The records of its having done so are not reliable, nevertheless there seems no reason why birds that have been "pricked" and are unequal to a long migratory flight should not nest in this country, as quail and full snipe do in India in such circumstances.

The regular breeding area of the jack snipe includes Siberia, Russia north of St. Petersburg, Finland and Northern Scandinavia. As all the bogs in those countries are frozen during the winter, the snipe must perforce migrate. They winter in the milder parts of Europe, in North Africa, and Central and Southern Asia. Jack snipe begin to arrive in the British Isles towards the end of September, and most of them remain with us until the end of March or the beginning of April. They do not reach India until late in October, and all leave by the middle of March.

As the jack snipe nests in countries of which the inhabitants do

not study ornithology, our knowledge of its breeding habits is meagre. Like the full snipe it indulges in strange nuptial flights.

M. Buturlin wrote to Dr. P. H. Bahr: "The bird usually flies so high that even with the aid of the midnight sun and a good Zeiss binocular it is often quite invisible."

Even as the common snipe "bleats" during its aerial evolutions, so does the jack snipe produce strange sounds. Wooley writes: "It was on the 17th June, 1853, in the great marsh at Mænonioniska, that I first heard the jack snipe, though at the time I could not at all guess what it was. An extraordinary sound unlike anything I had heard before. I could not tell from what direction it came, and it filled me with a curious surprise. . . . I know not how better to describe the noise than by likening it to the cantering of a horse in the distance over a hard hollow road; it came in fours, with a similar cadence and a like clean but hollow sound."

Buturlin syllabises the sound as *top-toppy*, *top-toppy*. How it is caused is not known. The tail feathers almost certainly play no part in the production, for they are small and soft and in no way abnormal. Those who have heard the sound believe it to be vocal. This belief is strengthened by the fact that, as Mr. W. P. Pycraft has pointed out, the syrinx of the jack snipe differs in structure from that of the full snipe and the woodcock. The sound made by the jack snipe is very loud, being audible when the bird is too high in the air to be visible to the naked eye of a man on the ground.

The nest of this species is placed in a hollow usually among sedge or long grass at a dry spot in a swamp. It is lined with grass, leaves or other vegetation.

Egg-laying time is from about the third week in May until the latter part of July; being latest in the most northerly breeding grounds.

The eggs are very large for the size of the bird; the weight of the clutch of four is about two-thirds that of the bird! In shape, size and colouring they are very like those of the common snipe.

So similar are the habits of the two species that most of that which has been said of the larger one applies to the smaller. The two are generally considered to belong to one genus, and the jack snipe is

CHAPTER XV

THE WOODCOCK

WE have noticed the manner in which snipe are adapted to their peculiar mode of feeding. In the woodcock we see this adaptation carried a stage further. This bird may be described as: exaggerated snipe, or, to use a modern expression, a super-snipe.

The bill is a little longer than that of the snipe, overshot, ^{sw} at the tip and well supplied with nerves. According to Mr. ⁱⁿ Horwood (*Fortnightly Review*, 1927, p. 829) the woodcock takes its quarry with the tip of the sharp-pointed tongue. I am not in position to confirm or deny the truth of this assertion. I may, however, say that a woodcock kept by Mr. F. Finn used to seize part of its food with the tips of its mandibles and then mumble it in the same way as a horse takes a slice of bread from a man's hand.

The eyes of the woodcock are very large and are placed unusually high in the head. The large size is characteristic of the eyeless creatures which feed by night. The elevated position of the eyes of the woodcock not only enables the bird to look about while feeding, but when hiding in cover to see, without exposing the top of its head, what is going on around.

The ears are large, hidden under feathers and placed far forward near the corner of the mouth. Mr. Horwood suggests that this arrangement enables the woodcock to hear a worm moving in the mud. Acute powers of hearing must be a valuable asset to a bird that feeds on quarry hidden underground. Woodcock, like thrushes, plovers and other waders, have the habit of standing head on one side, as if listening, before plunging the bill into the soil.

Although the woodcock is obviously a large, short-legged snipe, it differs anatomically from the snipe sufficiently to justify its reclassification to another genus.

To men of science it is known as *Scolopax rusticola*.

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Size, position of the eye, and length of leg are not the only anatomical differences between the woodcock and the snipe

The wings of the former are considerably broader, in consequence its manner of flight is very different When flushed, it flits among the trees with a wavering motion like that of a bat W H Hudson said that in the twilight it seemed to him to have the appearance of a great hawk moth with extended proboscis

The hues and mottling of the plumage of the woodcock are like those of the snipe, but, whereas the latter is striped longitudinally on the head and back, the woodcock has three conspicuous black bands across the crown and back of the head

Part from the fact that on the average the female woodcock is smaller than the male, there is no external difference between the young, nor is it possible to distinguish with certainty between a young bird of the year and an older one

In some individuals the outer web of the first flight feather is marked with buff in some the buff is notched so that it has the appearance of a row of teeth At one time birds displaying this peculiarity were believed to be females Such markings appear to be characteristic of young birds, but do not occur in all specimens

Generally speaking, the hue of the female is more ruddy than that of the male

The plumage of the woodcock displays much variation White, dirty white, dark brown (like Sabine's snipe), pale brown, buff, creamy, and ashy varieties have been shot

Woodcock vary greatly in size and weight Such variations are partly, but not entirely, due to the condition of the bird The average weight of a female is about 12 oz, and that of the male 11 Individuals, however, are often met with weighing as little as 9 and as much as 15 oz Yarrell recorded at the beginning of the last century a monster weighing 27 oz, and another is said to have weighed 24

In bygone days sportsmen used to talk of a large woodcock which they called a double woodcock, or muffed cock Whether there used to be a giant woodcock which has become extinct, or whether the numbers 27 and 24 were misprints for 17 and 14 is a moot point

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To-day most sportsmen believe that there are two races, a large grey and a small red one, of which one is more sluggish than the other.

Most men of science deny this. Horwood, however, writes (*Fortnightly Review*, 1927, p. 831): "It has been noticed that the earlier birds to arrive in October are larger, with short feathers underneath, and their heads have a muffled appearance. Later arrivals in November are smaller, with no muffled features, their bills shorter and feathers smoother. Yet again, the earlier birds are described as larger and their legs are grey to rose colour. The later arrivals are smaller with bluish legs. . . . Observations on migration carried out on the coast and on lighthouses by migration committees have established the fact that the larger birds with a grey type of plumage come to us when a south-east wind is behind them, whereas the smaller reddish birds come when a north-east wind is behind them, the woodcock waiting until a favourable wind sets in before beginning to migrate."

As woodcock display great variation in respect of coloration and size, it would not be surprising if birds which breed in one locality were to differ from those that nested in another. It may well be that the large grey individuals are those which breed in the northern part of the nesting area, and the small red ones those that nest in the south. This would be in accordance with the observations of migration committees quoted by Mr. Horwood. The cold weather sets in earliest in the north, hence the birds that breed there should be the first to reach England, and, as birds when migrating prefer a cross wind slightly in their favour to a wind directly behind them, or a strong head wind, a north-east wind would be favourable to a bird migrating to the north-west, and a south-east wind to one travelling in a south-west direction. The question whether or not such local races exist is one to which attention might be paid with profit.

If possible woodcock are more voracious than snipe. "The enormous quantity of worms that these birds eat," writes Rennie (*Montagu's Ornithological Dictionary*), "is scarcely credible; indeed it would be the constant labour of one person to procure such food

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for two or three woodcocks. The difficulty of collecting such a precarious diet determined us to try if bread and milk would not be a good substitute, and we found that by putting clean washed worms into that mess, the bird soon acquired a taste for this new food, and will now eat a basin of bread and milk in twenty-four hours, besides the worms it can procure."

Woodcock ordinarily feed chiefly at night. During the day they lie up in cover, generally in woods, sometimes at a considerable distance from their feeding grounds. The poacher takes advantage of the fact that they leave their cover every evening by the same opening to set nets to catch them as they fly to their feeding grounds.

While lying up during the day they do a certain amount of feeding, rummaging among fallen leaves in search of insects where the ground is too hard to be probed.

Like the snipe, the woodcock is dependent for existence on soft mud, hence it suffers much during a prolonged spell of frost. In hard weather woodcock speedily lose condition and many then shot are very thin. At such times they search in ditches and hollows for insects that may be lurking among the decaying leaves. During severe frost woodcock are often flushed from the depths of a dense wood. Mr. L. H. De V. Shaw suggests (*Snipe and Woodcock*, p. 141) that these are birds engaged in a search among fallen leaves for food.

Hunger emboldens the most timid birds, in very cold weather woodcock may be seen feeding in the open if there be any soft ground. Mr. R. Kearton writes (*Wild Nature's Ways*, p. 272) "A perfectly wild member of the species has been known to visit a Brighton garden to jostle with thrushes and blackbirds for food doled out by the hand of a kind benefactor." Dr. Mackenzie of North Uist informed him that during frosty weather he has frequently seen woodcock crouching on the high road in the hoof-print of a horse, and he has actually driven over one while so resting.

Probably when the weather in England becomes very severe all the migratory race of woodcock go south in search of food, and only the non-migratory individuals remain to eke out existence as best they can.

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Woodcock occur and nest in suitable localities in all parts of the British Isles, except the Shetlands and the Outer Hebrides.

Formerly they seem never to have bred in Scotland and rarely in England. White includes the woodcock among the winter visitors to Selborne. He states that it used to appear there "about old Michaelmas." In 1770 he writes: "Sure there can be no doubt that woodcocks and fieldfares leave us in the spring, in order to cross the seas, and to retire to some districts more suitable for the purpose of breeding. That the former pair before they retire, and that the hens are forward with egg, I myself, when I was a sportsman, have often experienced. It cannot indeed be denied that now and then we hear of a woodcock's nest, or young birds, discovered in some or other part of this island; but then they are always mentioned as rarities and somewhat out of the common course of things."

Montagu, writing some fifty years later, states that the bird occasionally breeds in England and records that eggs were taken in 1795 and 1805, and that half-fledged birds were captured in 1802.

The woodcock now nests regularly with us, and there is evidence that the numbers which breed in the British Isles are on the increase. This is difficult to account for, particularly in view of the fact that the increase has been accompanied by a diminution in the number that visit us in winter.

It would seem that the causes of the recent extension of the breeding range of the woodcock into this country are the comparatively recent practice of shooting birds flying, and the still more modern double-barrelled breech-loading gun.

The man who shoots a bird sitting almost invariably bags it, while he who fires at it when on the wing sometimes injures it slightly.

When men first took to shooting flying birds they did not attempt long shots. They ran no risk of missing, loading then not being the easy thing it now is. The woodcock has the reputation of being easily brought down at long range, in consequence sportsmen habitually take longer shots at it than at partridges or pheasants. Most of these long shots are made with the second barrel, and it is probable that many woodcock hit in the wing by a pellet, although

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other sortes layed together, the chieftest plentyys betwene Michaelmas and Christmas "

Until the end of the eighteenth century woodcock were so numerous that netting them was a regular occupation Shakespeare and other early writers frequently refer to this catching of the woodcock " Cockshut time " and " cockshut light " were expressions often used to denote twilight.

The fowlers used to take advantage of the fact that woodcock leave the wood in which they lie-up during the day by the same aperture every evening—either by a glade or an artificial opening made by man. Across this at sunset a large net was spread, attached to branches of trees by ropes running over pulleys. A man in hiding held the ends of the ropes. The instant he felt a woodcock touch the net he let go the ropes, so that the net closed over the bird. As the woodcock all leave the wood shortly after sunset, the nets were dropped at this hour, which came to be known as cockshut time.

Nooses used to be set on the woodcock's feeding grounds, at places where the fowlers perceived its borings, i. e. the perforations made by the bill, or its splash—the droppings. Each noose used to be placed at the apex of a V-shaped fence made of small sticks close enough to prevent the birds passing through them. A similar device is employed in India for snaring partridges.

The cause of the diminution of the numbers of woodcock seen in the British Isles in winter is not very clear. Possibly the reclamation of marshes and the increase of the human population are contributing factors. One theory is that, owing to the quantity of woodcock eggs taken in Scandinavia for the market, the species has decreased in numbers there, and in consequence fewer come to the British Isles in winter. I am not aware of any evidence in support of this theory.

Another theory is that the winter in Western Europe is not so severe as it used to be, in consequence the woodcock tarry longer in their breeding grounds and, when eventually the cold forces them to leave, they migrate in a southerly direction and thereby miss the British Isles.

Some support to the theory that woodcock have to some extent

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changed their route of migration in recent years occurs in a most interesting letter written by Sir Frederick Milbank to Sir Ralph Payne-Gallwey (see *Badminton Library* Shooting*, p 127) regarding the falling off in the numbers of woodcock in Lewis and Harris (one of the Hebrides)

The following table shows the number of woodcock shot in various seasons by the writer of the letter

<i>Year</i>	<i>No of woodcock bagged</i>	<i>Date to which shooting extended</i>
1854	426	End of November
1856	351	do
1857	251	do
1858	381	do
1859	167	November 2nd
1860	216	November 3rd
1861	181	October 31st
1862	Under 100	do
1863	do	November 1st
1864 to 1870	Less than 20	

In 1870 Sir Frederick Milbank gave up the shooting. He writes in 1886 "Woodcocks appear to have forsaken the island, as I understand from my late forester, who still lives thereon, that he now seldom sees a woodcock."

The woodcock, although less abundant in England than it was in Shakespeare's day, seems to be increasing in numbers. This is doubtless because it regularly breeds with us, and some landowners have laid out coverts well suited to its requirements.

We have noticed that there are grounds for believing that two races of woodcock visit us in winter. Do those that nest in the British Isles constitute a third race which is resident?

Ogilvie contended that all woodcock are migratory and that those which nest in the British Isles go south in the autumn, and our winter population is composed exclusively of birds which have nested in Scandinavia and other parts of the Continent. He supported this assertion as follows:

"In 1871 Mr Monk of Lewes carefully collected statistics of the

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number of woodcock breeding in Sussex, and satisfied himself, after a most searching enquiry, that not less than 150 nests might be found in any average season in the eastern division of that county alone. One hundred and fifty nests would represent 300 old birds and 600 young birds, if accidents of all kinds were avoided, making a total of 900 woodcock. Take 30 per cent off for disaster of one sort or another, and we have still 630 left—say, in round figures, 600 birds in one part of the country alone during the early part of summer. Where, then, are these 600 birds when the shooting season opens? In Sussex, a great many of the small coverts and shaws are shot in the first half of October, from the 1st onwards, and yet a 'cock is hardly ever seen then, though they become plentiful again as soon as November comes in. What is the explanation of these facts? It seems clear enough. The breeding birds have completed their moult and left for the south with their home reared families long before and the rush of foreign migrants has not yet set in."

The ringing of young birds has disposed of the theory that all British woodcock are migratory, even as ringing snipe has proved that some of those birds are resident in the British Isles.

A young woodcock ringed in Stirlingshire on May 16th, 1924, was recovered in the same county in November 1924, one ringed in Lancashire on May 21st, 1924, was recovered in that county on January 28th, 1925. Of two birds ringed in Lancashire on July 8th, 1924, one was shot in Yorkshire on October 22nd, 1924, and the other in South Devon on January 23rd, 1925.

A young woodcock ringed in Kirkcudbrightshire on June 7th, 1918, was recovered in Westmeath on January 6th, 1920.

Some statistics regarding the recovery of woodcock ringed in Cumberland, Northumberland and the south-west of Scotland are given in *British Birds* (vol. x, p. 219). Thirty-seven of the nestlings ringed were recovered, 20 near the place at which they were ringed and 17 at a distance, namely, 14 in Ireland, one in Essex, one in Elgin, and one in France.

It is thus apparent that there is a resident race of woodcock, members of which move about in the British Isles, apparently in an irregular manner. The reasons for this local migration are those that

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govern the movements of snipe. The bird recovered in France may indicate that some of the birds bred in the British Isles depart for the Continent in the autumn, or it may be that this bird, although one of the non-migratory race, migrated in company with some woodcock of the migratory race.

We shall notice that mallard hand-reared in England sometimes migrate from the country in the following spring.

As the plumage of the woodcock is subject to considerable variation, it is not improbable that the resident race which has recently arisen may eventually differ in appearance from the migratory race or races.

Mr. James Shenk recently published an essay on the migration of woodcock. An abstract of this, in English, appeared in *British Birds*, vol. xix, p. 34. Shenk's chief conclusions are

- (1) Many woodcock do not migrate, even in high latitudes.
- (2) Both young and old woodcock return each year to their native places.
- (3) The winter area of migratory woodcock in Europe includes Ireland, south England, south-west France, the Iberian Peninsula, Italy, Turkey, Greece and the Mediterranean islands.
- (4) Woodcock from the same summer area often do not seek the same winter quarters.
- (5) Woodcock from different summer areas often resort to the same winter quarters.
- (6) Autumn migration takes place in a south-westerly direction.
- (7) If, after it has been travelling for one, two or three days, a woodcock strikes, in the course of its migration, a coast-line, it almost always follows this to its winter quarters, which are thus reached by a circuitous route. Scotch and English migratory woodcock first fly south-west until they reach the west coast of Ireland or Cornwall, when they cross the Channel and then travel along the coast of France till they arrive at their winter quarters.

Thus woodcock, when migrating, hug the shore as far as possible. Probably they do so because their powers of flight, although considerable, are not nearly so great as those of swallows and swifts.

Woodcock sometimes arrive in England in such a state of

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exhaustion that they can hardly raise themselves off the ground St John, in the course of an admirable chapter on the species, writes (*Wild Sports of the Highlands*) "No bird seems less adapted for a long flight across the sea than the woodcock, and it is only by taking advantage of a favouring wind that they can accomplish their passage An intelligent master of a ship once told me that, in his voyages to and from Norway and Sweden he has frequently seen them, tired and exhausted, pitch for a moment or two with outspread wings in the smooth water in the ship's wake, and having rested themselves for a few moments, continue their weary journey "

Jesse records (*Gleanings in Natural History*) a case of a woodcock flushed near the Humber alighting on the sea and after riding the waves a short time, flying off

Despite their alleged ability to ride the ocean wave, numbers of woodcock perish during migration Many drowned birds have been picked up off the west coast of Ireland

Nor is drowning the only danger to which woodcock are exposed during migration As in the case of other migrants, many are killed by flying against lighthouses A correspondent of the *Evening Standard* (March 13th, 1912) states that one morning over five hundred woodcock were picked up below the Pointe de Penmarch Lighthouse in Brittany

The woodcocks which visit the British Isles in winter come mostly from Scandinavia As they migrate by night, their arrival on our shores is rarely witnessed The influx begins about the middle of October, the birds taking advantage of a light easterly breeze

(8) The return journey in spring is in a direct line by the shortest route At this season they are in better fettle By the autumn their energy has been sapped by their parental duties and the moult they have undergone During the winter they are able to store up energy on which they can draw for the migratory flight and the duties of parenthood

As regards migration, birds fall into three classes

(1) Those which, like the partridge, rarely travel far from their birthplace

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(2) Those of which there seem to be a migratory and a non-migratory race. Of this class woodcock, full snipe and wild duck furnish examples.

(3) Those of which all individuals migrate periodically. The quail and the jack snipe fall into this category.

Birds of the last class generally return for nesting purposes to the locality in which they were hatched. There are, however, a few aberrant species which seem never to nest in the same locality for two successive years, of such rosy starlings, locust birds and waxwings are notable examples. The young of the first two species feed on locusts, hence the parents must nest where these swarm. The seemingly erratic behaviour of the waxwing may likewise be the result of the feeding habits of the young.

Birds of the second class seem usually, but not invariably, to nest in the locality in which they were born, such probably return autumn after autumn to the same winter area.

A woodcock ringed by Mr W. Ashley in the summer of 1912 in County Sligo was seen with a brood of four on June 21st, 1915, near where it was ringed, it was observed again in the same locality on July 11th, 1922.

As long ago as 1797, Mr E. M. Pleydell's gamekeeper netted a woodcock in Dorsetshire in December. The date of its capture was scratched on a strip of brass which was bent round the woodcock's leg. The bird was then liberated. It was shot in the December of the following year in the same locality, still wearing the brass band.

There is no proof that either of these woodcock belonged to the migratory race, but as there was no record of a nest in England in 1797, it is not improbable that the latter was a migrant.

The breeding area of the woodcock is very extensive, it comprises the greater part of Europe, the Azores, the Canaries, Madeira, Northern and Central Asia, including Kashmir, the Himalayas at altitudes of over 10,000 feet, and Japan.

In the British Isles pairing takes place about the end of February, but is earlier or later according to the mildness of the season.

At nesting time the males strut with the feathers of the head puffed out to the uttermost, wings drooped and tail fanned. This

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performance is usually spoken of as courtship, quite wrongly in my opinion because in most species it occurs as frequently after pairing has taken place as before. Darwin believed that this display was made with the object of captivating the female. A few naturalists still hold this view. It seems more probable that these antics are merely an expression of the *jote de vivre* which the bird experiences at the happy spring season. If their purpose is to attract the female, what is the explanation of the strange aerial evolutions that are performed by both sexes, more especially the male, a little later in the season? I would attribute both to the same cause—the joyousness of the birds.

Instead of flying high in the air as the snipe does in such circumstances, the woodcock performs at low elevations. It flies to and fro, or takes a triangular or crescentic course for some twenty minutes in the early morning and early evening, the beat on these occasions varying from about fifty to two hundred yards. During these flights the males emit strange sounds, as easy to recognise as they are difficult to describe. In this connection I take the liberty of quoting a passage from W. H. Hudson's *Birds and Man* (p. 267): 'Of an afternoon, snipe would rise up from the bogs, to fall and rise and fall again, emitting their mysterious sound each time, far off and faint, like distant tremulous bleatings of invisible kids wandering lost on invisible mountains. But in the evening, after set of sun, another more fascinating sound would be heard—the low grating, grunting note, as of a hoarse cornercrake, twice or thrice repeated, followed by a burst of sibilant sound, shrill as the screaming of a bat or the piercing squeak of a frightened shrew mouse. This was the evening cry of the woodcock, and up and down they would fly, 'roding' as it is called, or 'showing off' at the side of a dark high wood.'

St. John likens the sounds to the croak of a frog, varied by a short shrill chirp. The futility of attempts to syllabise these sounds may be gathered from the fact that Mr. Ogilvie Grant calls the one a whistly *psip* and the other a guttural *ork, ork ork*, while Mr. De V. Shaw likens the one to *whir-ee-ee* and the other to *tree, tree*.

Sometimes two or more birds take part in these aerial evolutions

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and engage one another in what St John describes as a kind of tilting match. He states that he remembers when a boy seeing a gamekeeper shoot three at a shot while taking part in one of these aerial tournaments.

The nest is a very meagre one, usually being made of a few dead leaves and grasses placed in bracken or heather, often near the foot of a tree.

In this normally four eggs are laid. Mr P F Bunyard records (*British Birds*, vol xvii, p 193) finding a clutch of eight woodcock's eggs. Although these were, to use his expression, "as alike as peas," it is highly probable that they were the produce of two hens. The eggs are less pointed than those of the snipe. The shell is buff or reddish grey with a few reddish brown and pale purple-grey blotches.

Eggs have been found as early as March 2nd, but the majority are laid in the last week of March and in April.

If the clutch be destroyed, a fresh one is almost invariably laid within about a fortnight of the loss of the first, a new nest being some yards from the old one.

Frequently eggs are taken in July, and the Rev F C R records finding them as late as August 5th. Whether this is at the woodcock is double-brooded or these very late eggs result of a series of misfortunes to the earlier clutches is a matter of uncertainty. St John states definitely that the woodcock lays a second time in July and August. As these late clutches are far less numerous than the spring ones, it is clear that every pair does not rear two broods in the season.

The female undertakes the greater part, if not the whole, of the duties of incubation. When flushed from her eggs, she sometimes flutters away as though her wing were broken, as do the partridge and the mallard duck. She will behave in the same manner when surprised with her brood.

Woodcock nestlings are covered with rich chestnut and brown down when they emerge from the egg, and are able to run very shortly after being hatched. As the place in which the woodcock nests and lies up during the day is often at a considerable distance

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from the feeding ground,*and as the intervening space is usually covered with coarse vegetation and the nestlings cannot fly until they have been hatched*about a fortnight, it sometimes happens that these are unable, without assistance, to make the daily double journey The parent woodcocks overcome the difficulty by carrying their young Several species of birds are known to perform this feat occasionally, but the woodcock seems to be the only one which habitually does so The fact that the woodcock carries its young has been known for many years, but the method adopted is still a matter of dispute

Scopoli wrote of the woodcock more than one hundred and fifty years ago *pullos rostro portat fugiens ab hoste* White's comment on this is " I have only to remark that the long unwieldy bill of the woodcock is perhaps the worst adapted of any among the winged creation for such a feat of natural affection " Later it was asserted that the woodcock carries the young on the back

Those who declared that woodcock carry their young in either of the above ways doubtless used to the full their power of imagination

Some naturalists assert that the young are carried between the thighs of the parent, a few aver that the young one is clasped between the bill and the breast of the adult, the majority say the young are held in the feet or claws

As the matter is of great interest and further observation is needed I will refer to a number of recorded observations

St John wrote (*Natural History and Sport in Moray*, p 199) that the woodcock accomplishes this feat ' by clasping the little bird tightly between the thighs and holding it tight towards her own body "

Mr C B Moffat writes (*The Irish Naturalist*, 1899) " The female as I approached sat closer than had been her wont, and on rising I was almost immediately struck with a curious yellow object that seemed to hang from between her legs The bird's flight was slower than usual, and her long bill was plainly seen to be directed forwards in the ordinary attitude, and not in any way used to steady or support the object carried "

I have come across two observations of the old bird carrying the young between breast and bill

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Mr. R. J. Ussher writes (*Snipe and Woodcock: Fur, Feather and Fin Series*, p. 265): "James MacEvoy, a woodman . . . saw a woodcock carry by turns three of her young ones past him as he worked in the woods where there was nothing to cause alarm; in this case the bill was pressed towards the breast to help in supporting her offspring."

Miss Fairholme writes: "My sister and I were standing in a field . . . and our two dogs were hunting in a small oak wood on the other side of the fence near us, when we heard a noise close behind us, something like the cry of a kestrel but not so loud. On turning round we saw a woodcock crouching on the ground, fluttering her wings and crying. On going a step or two towards her, to see if she were hurt, she gathered up two little ones; one clasped to her breast by her head and beak and the other between her feet. She flew on slowly a few yards to the top of a very low bank where she let down the young ones, and crouched over them, fluttering her wings and crying as before. We waited to see what would happen when the dogs came out over the fence of the wood. The bird immediately raised up the two young ones as before, and flew back into the oak-wood. Both flights were short, and she flew heavily and near the ground, so that we saw the whole proceeding perfectly."

Most of those who have witnessed the performance assert that the young are carried between the feet or claws of the parent. Miss Fairholme says that one of the young she saw was held between the feet. About 1830 a letter appeared in the *Elgin Courier* stating that a woodcock had been observed carrying a young one thus.

St. John, who, as has been mentioned, stated that the young are carried between the thighs, wrote in his *Wild Sports of the Highlands* (p. 222), published in 1846: "I have . . . ascertained that the old bird lifts her young in her feet, and carries them one by one to their feeding ground. Considering the apparent improbability of this curious act of the woodcock, and the unfitness of their feet and claws for carrying or holding any substance whatever, I should be unwilling to relate it on my own supported evidence, but it has been lately corroborated by observations of several intelligent

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foresters and others, who are in the habit of passing through the woods in March and April "

The Duke of Beaufort wrote (The Badminton Library *Shooting*, p 118) " In the New Forest in the year 1850, I came upon a female woodcock watering her three young ones at a rivulet She picked up one in each claw and flew off with them I hid in a high gorse brake close by, and saw her return in four or five minutes and pick up the remaining bird also in her claw "

Littledale writes from Kashmir " Up flew a woodcock about five yards from my feet She had a young one—the men said two young ones, but I could not see two distinctly myself—in her claws pressed close under her, and she flew slowly and heavily for about ten yards, then rested above a bramble which the young one seemed to catch hold of with its claws or become entangled in The old bird fluttered for quite half a minute over it, before she could pull the little one clear "

Mr E C Stuart Baker records (*Journal of the Bombay Natural History Society*, vol xx, p 27) that a friend in Scotland wrote to him " We came upon this bird very suddenly, and she rose almost at my feet and made off with a young one held tightly up against her breast, and, I think, on either side by her claws As she left three young ones behind her when she first flew away, I at once hid myself and awaited to see what further she would do In a few minutes back came the old lady and dropped on the ground close to the nest, and, after scuffling about a bit, she grasped one of the young ones on either side and picked it up As she rose I could see that her extended legs held the young one low down on either side, but she at once drew up her legs close to her body and then appeared to be carrying it between her breast and thighs—this, of course, owing to the contracted position of her legs "

Mr R J Ussher states that an Irish keeper saw a woodcock carrying her young one between her feet

Davidson, in Kashmir, saw one of these birds conveying a youngster " between its feet or legs "

A picture of a woodcock carrying a young one by Mr A Thorburn and one by Mr C Whympers appear respectively in *Snipe and*

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Woodcock (Fur, Feather and Fin Series) and *Shooting* (The Badminton Library) In both these the parent bird is depicted grasping the nestling with her feet, which are pressed close up to her body. On the other hand, in a plate published in the *Zoologist* of 1879, the legs of the bird carrying the young are dangling. In this connection it may be noted that in the case of the guillemot and some of the ducks, which occasionally convey their young from lofty nests to the water, there is similar conflict of evidence.

The operation, like the three card trick, seems to be carried out so quickly that the eye cannot take it in properly.

The majority of those who have witnessed it say the young are carried in the feet, and so good was the opportunity of watching the operation enjoyed by the Duke of Beaufort, Miss Fairholme and Mr Baker's friend, that it seems reasonable to accept their accounts. Unfortunately these do not agree. Moreover, is it possible for a woodcock, when surprised with its young, to grasp one with its claws in an instant? A bird, not pressed for time, might be able to rise from the ground, and, when fairly on the wing, hover^a kestrel-wise over a young bird and seize it in her claws, or she might, if surprised while brooding her young, instantly grip it with her thighs and fly off with it. Possibly the cinematograph operator may be able one day to settle the question, meanwhile every eye-witness, in the interest of science, should record what he sees.

It may here be mentioned that there are a few records of the snipe carrying its young. Mr W J Nash states (*British Birds*, vol x, p 191) that he witnessed this, the bird was so doubled up that the bill met the claws and thus was the youngster supported.

It is recorded (Morris's *British Birds*, vol iv, p 236) that the Hon George F Berkeley saw in the New Forest a woodcock carrying an egg. Cases of birds carrying eggs are not very uncommon, they are apt to do so when the nest is tampered with.

Another allegation concerning the woodcock which requires further investigation is that the bird, when wounded, sometimes makes for itself a very ingenious dressing with the aid of beak and feathers. Monsieur Victor Fatio read a paper on this subject before the Geneva Natural History Society on April 19th, 1888.

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He stated that on two occasions he shot birds having old wounds on the body which were covered with downy feathers plucked from the body and stuck to the wound by coagulated blood. In three cases he found ligatures of feathers bound round a broken leg. In one of these both legs were broken and ligatured, during the operation some feathers had become curled round the end of the bill and stuck to it. As the bird, owing to its broken legs, was unable to remove these feathers with its claws, it could not feed and was half starved when he shot it.

It is interesting that such unusual behaviour should be observed in a bird of which the bill is almost unique in that at the end it is as sensitive as the human finger.

Mention must be made of a suggestion made by no less an authority than Mr W R Ogilvie Grant, namely, that the male woodcocks largely outnumber the females. That naturalist found that of more than sixty woodcock examined by him in the Azores, only four were females. This, of course, is not sufficient evidence upon which to base a pronouncement. Unfortunately it is not possible to distinguish the cock from the hen without dissection, so that, until sportsmen interested in the subject dissect large numbers of birds shot in order to determine the sex, the matter must remain *sub judice*. Personally I am inclined to doubt whether there is great disparity in number of the sexes of any species of bird.

The record bag of woodcock made in the British Isles was obtained in Ireland (*Record Bags and Shooting Records*). On January 28th, 1910, no fewer than 228 fell to six guns in County Galway. This appears to be more than twice the size of any day's bag in either England or Scotland. Full information on the subject is contained in the above mentioned book.

CHAPTER XVI

THE MALLARD

HAVING studied birds long enough to have learned that it is not safe to make a sweeping statement regarding them, I will not say that the duck is the finest bird in the world, but I ask: Can anyone name one more admirable?

There are, indeed, birds more swift of flight, more fleet of foot, more adept at swimming and diving, more valorous. Moreover, the duck is no musician. Few birds, however, have so fine a physique. Thanks to this the range of the wild duck extends over the whole of the northern hemisphere. Wherever there is fresh water there will he be found; nor is he afraid to trust himself to the sea.

I know of no bird more amiable and less pugnacious than the duck. His very name is used by human beings as a term of endearment.

No bird becomes so tame and confiding when well treated; no bird is so easy to domesticate.

St. John writes (*Wild Sports of the Highlands*, p. 129): "I have frequently caught and brought home young wild ducks. If confined in a yard, or elsewhere, for a week or two with tame birds, they strike up a companionship which keeps them from wandering when set at liberty. Some few years back I brought home three young wild ducks: two of them turned out to be drakes. I sent away my tame drakes, and, in consequence, the next season had a large family of half-bred and wholly wild ducks, as the tame and wild breed together quite freely. The wild ducks which have been caught are the tamest of all; throwing off all their natural shyness, they follow their feeder, and will eat corn out of the hand of any person with whom they are acquainted."

As regards beauty, the mallard, it must be admitted, has not the sprightliness or the elegant slimness of many birds, but none is

built on more comfortable lines There is not an angle in his contour, as he rests lightly on the water he presents a picture of placid contentment Rogeron calls him *le bon bourgeois* of the bird world

As to colouring, when in full dress he need not shrink from comparison with any other creature His head and neck are glistening green, separated by a white necklace from the rich chestnut breast The upper back, shoulders and flanks are white, delicately pencilled with black wavy lines, causing them to appear pale grey The wing is adorned by a broad band or speculum of metallic blue, edged with white The lower back and rump are velvety black, as are the four middle tail feathers, the ends of which have an elegant upward curl The remaining tail feathers are white The legs and feet are reddish orange The hue of the bill varies from olive-green to yellow, the " nail " being black

The eclipse plumage, the manner of its acquisition, and its transformation into full dress have already been discussed

It must be admitted that the female is not nearly so beautiful as the drake She has his comfortable build, but her colouring is subdued Her brown garment is modestly decorated with concentric dark bars, which cause the mottled appearance of the females of many species of duck and the males of a few The only dashes of bright pigment she displays are a blue speculum and reddish orange legs Her bill is generally orange with a brown patch or saddle occupying the proximal two thirds, but not extending to the edges or the base

The mallard exhibits variations in plumage Some females are abnormally pale and others very dark, showing a tendency to albinism in one direction and melanism in the other Doubtless the domestic breeds known as the Aylesbury and the Buenos Ayres or East Indian are derived respectively from albinistic and melanistic " sports "

Mr F Finn has pointed out (*Avicultural Magazine*, January 1913, p 82) that, of the mallard kept in the London parks, " many of the drakes vary from the typical form with white collar, chocolate breast and grey flanks, in two directions—in one case the white collar remains, but the reddish brown of the breast is continued

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along the flanks and sometimes on to the shoulders, while the upper parts are of a paler grey, often nearly white; in the other, the white collar disappears and the pencilled grey of the flanks invades the breast, to the complete exclusion of the chocolate tint, reaching up to the green of the neck."

The loud *quack, quack*, with which everyone is familiar, is the call of the female; that of the male is a feeble, wheezy quack, such as might be expected to emanate from a duck rendered husky by cold. Gilbert White describes the voice of the duck as "loud and sonorous." Some may take exception to the second adjective, but none will object to the first, or to the statement "the voice of the drake is inward and harsh and feeble and scarce discernible."

Where the notes of the male and female differ, that of the male is generally the more powerful; ~~where~~ this should be reversed in the case of the mallard I know not; it is not a peculiarity of the duck family, for, as we shall notice, the loud *whew* of the wigeon is confined to the drake.

Its wide range and the fact that it is the ancestor of all domestic races of duck, except the Moscovy, entitle the mallard to pride of place among the Anatidae. Montagu, in his *Ornithological Dictionary*, styles it "The Duck."

For some two centuries it was known to men of science as *Anas boscas* or *boschas*, but of late it has become *Anas platyrhynchos*.

When the lakes and streams on which the mallard have spent the summer become frozen the birds migrate. Some go south, some south-west, others west. Owing to the effect of the Gulf Stream the western parts of Europe enjoy a much milder winter climate than the eastern and central portions. This accounts for the migration to the west that occurs in the autumn. Mallard are impatient of great heat, hence those that winter in the far south go north in spring to escape this; the mallard is merely a winter visitor to South China, the plains of India, Mexico and Panama.

The British Isles are within both the breeding and the winter area of the mallard. Many nest in Great Britain, many more come to us in the autumn from Ireland, Lapland, Scandinavia, Denmark, Holland and North Germany.

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According to Bosworth-Smith nine-tenths of the mallard seen in England are merely winter visitors. This may be a fairly accurate general statement, but, in some years, the number of winter visitors is far larger than in others. The main body of migrants come to us between October 21st and November 1st, and there is evidence (see *Country Life*, November 5th, 1927) that, if heavy west or south-west gales blow during that period, ducks come to us in diminished numbers. Birds on migration prefer a cross wind to any other, and cannot make headway against a gale, in consequence, if west or south west gales are blowing when the mallard in the north are impelled by instinct to migrate, many, which would normally reach the British Isles, strike the continent of Europe.

Much information regarding the migration of mallard has been obtained by the method of ringing birds. Dr A. Landsborough Thomson has drawn up (*British Birds*, vol. xvi, p. 262) an admirable summary of the results obtained. From these it is apparent that there are in the British Isles two races of duck—a resident and a migratory. The individuals of the former not only do not leave our country but rarely wander far from their birthplace.

The only way of determining the proportions of the two races is by ringing birds in winter and noting the places at and the dates on which such birds are recovered. Sixty-two adults ringed in the British Isles in winter have been recovered, 46 of these recoveries were in winter in England. These do not help us to determine the extent of migration, because it is not known where these birds summered, three, however, were recovered in the British Isles in the summer and twelve abroad, namely, eight in Sweden (four during August, one in September, one in October and two in November), one in the Faroes in May, two in Finland in August, and one in Holland in November.

The above figures indicate that the migrants outnumber the permanent residents by about four to one, and that some of our winter visitors do not come to us until the end of November or later.

Ringling operations show that a few of the mallard reared in the British Isles leave us in spring, probably in company with the

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regular migrants. One hundred and twenty British-reared birds ringed in summer have been recovered, 115 near their birthplace and five at a distance. One of the latter was a female found with a brood in Denmark in July of the following year; of the remainder, three were recovered in August in Sweden, France and North Germany, and one in Ireland in December of the following year.

From the foregoing it is apparent that the mallard is capable of performing overseas journeys. Although by no means the swiftest of the ducks, the mallard is said to attain a speed on the wing of 58 miles an hour.

Although all duck fly in the same style, each species has its little idiosyncrasies, whereby an experienced sportsman is able to distinguish it when on the wing. It is possible to identify each species merely by the sound made by the wings of a flock in motion. Few naturalists are able to do this, but very little experience enables a sportsman to see at the first glance whether or not a flying bird is a duck. Except when about to alight, a duck never sails on outstretched pinions, nor does it ever hover kestrel-like. It flies swiftly, with steady, rapid wing-beats, the neck being fully extended. Imagine a Schweppes soda-water bottle on wings, and you have a fair mental impression of the form of a duck as it speeds through the air.

Geese may be distinguished from ducks during flight by their large size, slower wing-beat, differently-shaped head and bill; also by the cries they emit; moreover, they invariably fly in V-shaped formation. Ducks, however, often range themselves thus when travelling a long distance.

Inexperienced sportsmen sometimes shoot a coot in mistake for a duck. The black plumage, narrow bill, more laboured flight and the toes projecting beyond the tail suffice to differentiate this duck-like moorhen. Moreover, there is the difficulty with which it rises from the water; a duck, as it were, leaps into the air, but the coot has to flog the liquid element with its wings and feet several times before it succeeds in rising, as do grebes, which are also sometimes confounded with ducks. On the wing, grebe are readily distinguish-

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able by the very long neck, pointed bill, and feet projecting far beyond the tail

The statement made by every writer that mallard in the wild state feed by night is correct, but where St John and many others go wrong is in asserting that they feed only at night time. They, in common with almost if not all other species of duck, seek their sustenance both by day and night. M. Rogeron points out (*Les Canards*) that the duck is not adapted to nocturnal habits, its eyes not being large like those of snipe, owls, nightjars, and other nocturnal creatures. A duck has to grope for food thrown to it in the dark.

Rogeron asserts that ducks feed at night, not because it is their nature to do so, but because of the persecution of man. He likens them to human outlaws who venture abroad only at night the better to escape those who have proscribed them. There is doubtless some truth in this assertion.

Ducks are more nocturnal in their habits than they would be were they not shot at. Where they are not molested, as on the ornamental waters of parks, they show considerable activity throughout the day, but they habitually indulge in an occasional siesta either afloat or balanced on one leg ashore, with head buried between the shoulders.

Ducks appear to require very little sleep, probably five or even four hours' slumber in the twenty four suffices for them. This fact was brought home to me in India. For nearly three years I lived in a bungalow on the banks of a reach of the Ganges to which large numbers of ruddy sheldrakes (*Casarca ferruginea*) resorted in the cold season. During the day I used often to watch them feeding in flocks of twenty or more on the mud left by the receding river. All day long I used to hear their unmistakable sonorous call, and whenever I lay awake at night they were calling. Those birds seemed to sleep not at all!

Probably every species of duck feeds more or less energetically for some nineteen hours between each successive sunrise.

The notion that these birds feed only by night in the wild state doubtless owes its origin to the fact that, in most parts of Europe,

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when not nesting, they habitually spend the day in one locality and the night in another. This habit is the result of their food often being most abundant at places within the range of the sportsman's gun. Ducks visit such spots at night and spend the day on the sea, in the middle of a large lake, or on a mud-flat that affords no cover for the sportsman. Hence the regular flighting or movements between their feeding and resting grounds. In places where they are not shot at, as the Thames near London, ducks do not seem to make these periodical movements; there is no need for them to do so.

Although mallard habitually seek food on the shore exposed by the retreating tide, they appear to prefer fresh to salt water. In India I have shot mallard throughout the winter in localities fully 900 miles from the sea. During the four seasons 1921-25, 3,484 of these birds were shot on the Bhawalpur Lake, over 400 miles inland.

I have not been able to discover whether mallard feed throughout the night or occasionally call a halt and slumber for a little.

Those resident in the British Isles seem to pair for life. When they occur in flocks they are really in pairs. Whether migratory mallard mate for life is doubtful. In India during the winter flocks composed of members of one sex are commonly seen. It may be that the pairs break up in the autumn and reunite in spring, or the flocks may be composed of young birds.

From the fact that the antics usually, but in my opinion mistakenly, described as courtship take place at every nesting season, it does not follow that the birds do not mate for life. These nuptial performances take place after as well as before the birds have paired. They appear to be involuntary movements resulting from sexual excitement. They often occur under the influence of anger or other emotion. The drake rears up with neck bent, then drops back to the water, jerks the tail upwards and raises the wings slightly. The female usually follows suit. At this season the male whistles as well as quacks wheezily, and the duck, as if in response, quacks softly.

At the beginning of the nesting season the drakes sometimes indulge in a little mild fighting among themselves, especially if they

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happen to be more numerous than the ducks in any locality. In the spring of 1927 I was much entertained by the behaviour of a trio on the Thames near Kingston. This was made up of two drakes and a duck, one of the former had lost his curled tail feathers. I watched these birds on various dates between March 19th and April 11th, and on each occasion the three, whether on the bank or in the water, kept close together.

During the early part of the period the drake lacking the curled tail feathers contrived to keep himself always between the duck and the other drake, making a mild feint at the latter whenever he went very close to the female. If another drake came near the trio, one or other of the drakes would chase him away. On the 11th April I noticed that the curled tail drake was occupying the position near the duck.

Having paired, the female proceeds to seek a nesting site. In some cases she is accompanied by her spouse, but usually she slips away quietly and proceeds to make a nest of the existence of which the male does not seem to be aware. The sites chosen are very various. Nine out of ten nests are at ground level. Writing of the Scottish Highlands, St. John says "With us they breed principally about the most lonely lochs and pools in the hills, sometimes I have seen these birds during the nesting season very far up in among the hills. A few hatch and rear their young about the rough ground and mosses near the sea. Some few breed in furze bushes and quiet corners near the mouth of the river. Occasionally a wild duck fixes on a most unlikely place to build her nest in—for instance, in a cleft of a rock, where you would rather expect to find a pigeon or a jackdaw building, and I once, when fishing in a quiet brook in England, saw a wild duck fly out of an old pollard oak tree." The tops of pollard trees are not uncommonly chosen. In 1926 a duck made her nest on a pollard willow in the Canfield Gardens, Kingston, by which was a seat generally occupied on fine days. The duck, in order to reach her nest, had to fly to it from a much frequented path. That year two ducks had nests in a riverside garden at Hampton Wick in holes in stumps of trees about three feet from the ground.

Occasionally a mallard makes its nest at a considerable elevation

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pressure of the eggs against the breast seems to set up irritation which causes the bird to pluck at her feathers. From eight to fourteen eggs are usually laid. These are greenish white without any markings.

A contributor to *Baily's Magazine* (February 1881) records that when he tried to induce a wild duck to lay extra eggs by removing one daily, the bird deserted the nest. Unless the eggs meet with mishap only one clutch is laid each year.

Domesticated birds, however, sometimes rear two broods in the season. There is a record (*Field*, 1908, p. 721) of an aberrant individual who hatched thirteen eggs in the middle of October at Thames Ditton.

The full life of a duck appears to be about twenty years, but the bird usually ceases to lay when aged about fifteen. Barren females often assume some of the livery of the drake.

Incubation takes about twenty-eight days. The duck alone sits; the drake appears never to go near the nest. Indeed, in many cases he does not seem to be aware of its existence. I visited the joint nest mentioned above daily, but never saw either drake go within thirty yards of it. They spent much of their time away from the pond, probably on the Thames. When at the pond they kept well away from the nest. One would alight and call, and seem to be looking for his mate. As a rule she appeared to take no notice of his call, but, once on hearing it, she slipped stealthily off the nest, crept through the reeds in a direction leading her further away from the drake; on reaching the open water, she took wing and flew to him. After feeding in company for some time they flew off together. The female returned alone. Before leaving the eggs the mallard usually covers them with down: this serves to prevent them becoming chilled and, when the nest is exposed, to hide them from the eyes of a duck stealing creatures.

The duck is usually a close sitter; often she does not rise from the nest until nearly trodden upon by a human intruder. The frequent naturalist, Edward, found, after a snow-storm, a dead wild duck with mouth open and full of snow in a nest containing the nearly-incubated eggs.

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Ducklings are able to swim, run and pick up food as soon as they are hatched. They catch flies deftly. Those who believe that young birds have to be educated by their parents should watch the behaviour of ducklings from the moment they are free from the shell.

Their swimming powers are astounding. Miss I. Dorrien Smith states (*Avicultural Magazine*, May 1913, p. 201) that in the Scilly Isles some of the mallard nest on islets where there is no fresh water. The ducklings hatched on such are conducted by the mother across the sea to an island where fresh water is available. On one occasion she saw from a launch a wild duck swimming with fourteen ducklings in her wake. "These had evidently come from the island of Samson, which lies about three-quarters of a mile across the sea to the westward of Tresco, and the old bird was wisely braving the elements not to mention the gulls, to bring her family to the fresh-water pools of Tresco, for the shores of which island she and her ducklings were making as quickly as possible. On landing they had a steep bank to walk up and rough ground with bracken and brambles to get through, altogether a quarter of a mile to cross before the fresh water was reached. The whole brood apparently arrived safely, as a duck with fourteen young was seen there the next day."

Despite the swimming powers of ducklings, the average mother loses by drowning about four-fifths of every brood. She seems to have no notion of their powers of endurance and takes them such distances that the majority, sooner or later, become completely exhausted, lag behind, and eventually sink or fall victims to rapacious creatures. Ducks, like other birds, are unable to count hence the lost young ones are not missed.

There has been much speculation as to how ducklings hatched in a lofty nest reach the water. Stories are told of the mother bird carrying them to the water on her back or in her claws. Such tales do credit to the imagination of the inventors. What usually happens is that the mother flies to the ground and calls to her young, these, in response, tumble out of the nest. Mr. J. G. Milham states that if a newly-hatched duckling be dropped from the roof of a house it

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falls so slowly that it reaches the ground without any sensible shock, and no sooner is it there than it springs easily to its feet.

Ducks, however, occasionally fly to the ground, carrying a young bird in the bill. This has been observed by both Hudson and Rogeron.

The duck appears to be very solicitous of her offspring.

Sometimes, when surprised by a human being while at the head of her brood, she shuffles along with wing drooping as if injured, a few feet in front of the intruder, while her young scurry to the nearest cover.

"I have seen," writes Miss Dorrien-Smith (*loc. cit.*), "an old duck bravely defending her brood from a lesser black-backed gull, standing up and fighting for her family like a true Briton."

In heavy rain she spreads her wings over her young, and thereby prevents them being chilled by the downpour. "I have seen," writes Millais (*Natural History of the Surface-Feeding Ducks*, p. 11), "no less than ten wild ducks all sitting together in a shower protecting their offspring with the umbrellas with which nature has provided them."

The duck shows great anxiety when one of her chicks is in difficulties, but this soon gives place to annoyance, and, as likely as not, she will, if it is unable to extricate itself, peck it to death.

Ducklings are exposed to many perils. Some are killed by hail, others perish by falling into cracks in the earth from which they cannot be extricated. A considerable percentage fall victims to rapacious birds, pike, cats, rats, foxes and other four-footed creatures. Miss Dorrien-Smith, in the Scilly Isles, witnessed a duckling drawn under water by an eel.

The wings of the duckling are not well developed at the time of hatching. When the youngsters have been out of the egg a month, they are able to fly clumsily a few feet. In this condition they are known as flappers. Flapper-hunting used to be considered "sport." The author of *British Rural Sports* writes: "When the shooter seeks the wild duck in the shape of flappers, he should go to the brook, or pond, where they are supposed to be, in July, and send his dog into the rushes, woods, etc., along the banks. In process of time he will entice the old duck, and this will encourage him in

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the search for her brood By and by a young bird is seen to rush about among the reeds and makes, perhaps, an attempt at flight, in which she most probably falls a victim to your shooting propensities. The whole brood should be diligently followed when found, as those which are left will not remain to stand another hunt " As Colonel Hawker remarked, this form of sport is on a par with the slaughter of water-rats

Ducks are not able to fly well until they have been hatched about two months, and, as many of the adults do not recover fully their powers of flight lost during the moult until September, it is submitted that duck-shooting should not be permitted before October 1st

Mr J G Millais writes (*loc cit*) " Even as late as the middle of September I have seen old ducks with their young only half fledged, which have not yet moulted a feather " These, of course, were birds which had met with more than one nesting mishap

He further asserts that the female mallard does not moult until her young are old enough to fly He deems this to be ' a wonderful provision of nature, which makes one law for males and another for females, for whilst the former are skulking in the reed beds incapable of flight, the latter, now fitted for a life of activity, have to care for their little ones, teaching them to fly and guiding them to the best feeding grounds at night It would almost seem that to maintain the necessary power of flight the female mallard can of her own accord retain her old plumage as long as she likes, and does not therefore allow herself to suffer blood exhaustion by moult until her duties are accomplished and the strain of maternal cares at an end Moreover, should she commence to moult (as she occasionally does) before the young can take care of themselves, she does not generally moult her quills simultaneously, as the males do, but casts them unevenly or alternately, retaining a sufficiency of intermixed new and old primaries to support her in her flight "

With reluctance I take exception to much of the above statement I do not think that, as regards moulting, there is one law for the drake and another for the duck It is true that ordinarily the female does not moult until her young are able to use their wings, but

CHAPTER XVII

THE TEAL

WHY this elegant little duck is called the teal I have not been able to discover. It is a true surface-feeding duck, and has the bill and feet peculiar to such. The scientific name has recently been changed from *Nettion crecca* to *Nettion crecca*; the latter, being the earlier name, must prevail, according to the recently introduced priority rule, made to avoid confusion in scientific nomenclature. It often happens that well-intentioned measures do not meet with the success they deserve; this, I fear, is one of such. The number of changes the rule has involved is truly alarming.

The teal is barely fifteen inches in length and weighs about twelve ounces. It is the smallest of the European ducks. What it lacks in size, it makes up in quality. There is no duck equal to it as a table bird, and few can rival it as a pet. Like the mallard and many other ducks, it flourishes in confinement.

The male in the full glory of his breeding plumage, that is to say, from about November to June inclusive, is a handsome bird. The head and neck are chestnut, with a broad glossy green band, edged with cream, running down the sides of the head and extending to the neck. The upper cream margin curves over the eye to the base of the bill, thence to the chin. The back and sides of the body are white, heavily pencilled with black wavy lines. On the back are a few long buff lanceolate feathers, margined with black. The brown wings are set off by a brilliant metallic green band, narrowly bordered with white. Owing to this the bird is sometimes called the green-winged teal to distinguish it from the garganey or blue-winged species. The breast is white, heavily spotted with black like that of a thrush. The abdomen is white. The feathers under the tail are cream-colour and black. The bill is black. The feet are brownish grey.

The female wears a homely gown mottled brown and black, but

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she has a green wing-band, less brilliant than that of the male and bordered with buff

In June the drake doffs his gay plumage and then resembles the duck save that the breast is usually plain brown In August or September he begins to resume his bright colouring and is in full breeding livery by October or November

The range of the teal covers the whole of Europe and Asia and the northern part of Africa In America it is represented by an allied species To Africa and India it is merely a winter visitor

It breeds in the more northern part of its range, nesting regularly in Iceland, Finland, Lapland, Great Britain, Central and Western Europe, Siberia, Manchuria and North Japan, and occasionally in Spain, Italy and Greece The teal which have nested in parts of the globe that become ice-bound in winter, depart in the autumn to more temperate climes As in the case of the mallard, widgeon and pochard, the bulk migrate in a southerly direction, but a great many move westwards In addition to this there is considerable local migration India and Africa are the winter quarters of those which travel southwards in the autumn Those that move west winter in the the British Isles and, to a less extent, in France There is also a resident race in the British Isles, which is augmented in winter by migrants These latter seem to come mainly from Sweden, Denmark and Holland, but at present there are not sufficient data on which to generalise

Of a large number of teal ringed in the British Isles only seven seem to have been recovered two in Sweden and one in North Germany in the summer, one in Holland in winter, and three in the British Isles, as shown below

<i>Place and Date of Ringing</i>	<i>Place and Date of Recovery</i>
Wigtonshire, February 1915	Montgomeryshire, September 1915
Wigtonshire, March 1917	Moray, August 1917
Essex, February 1910	Cumberland, November 1910

The above figures indicate that the proportion of resident to migratory birds is far greater among teal than among mallard, and that the resident teal move about in the British Isles

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A number of teal have been ringed in Holland; of these nine have been recovered. One ringed in summer was captured in Dorsetshire in summer. Of eight ringed in Holland in October, one was recovered in Ireland in summer, four in Ireland and three in England in winter.

The recovery in Ireland in summer of a teal ringed in Holland in October is rather surprising. The bird may have gone to Ireland in the autumn shortly after being ringed and, for some reason, been unable to leave that country in spring.

Most sportsmen consider that the teal is faster on the wing than the mallard, and it is said to attain a speed of 68 miles an hour. Falconers, however, say that when a peregrine is thrown at both, the teal is the first to be taken, despite the clever way in which it can turn in the air.

The habits of the teal resemble those of the mallard. Both species subsist on the same kind of food. The teal is perhaps more vegetarian. Those that were kept in India in tealeries used to thrive on food containing no animal matter. Like the mallard and the widgeon the teal does not dive habitually for its food as a pochard does.

Teal prefer sedgy ponds to large lakes; they are in the habit of frequenting puddles in bogs. Except when compelled to pack by the severity of the weather teal are not usually seen in large flocks, and, after the families have broken up, they are often found in pairs or singly. They seem to avoid the sea and its shores unless compelled to resort to them by the freezing of the inland waters. Apparently they are more sensitive to cold than mallard are. This is probably the reason why they are rarely seen in the north of Scotland during the winter. Writing of Moray, St. John says: "The teal can scarcely be called a winter bird with us, although occasionally a pair or two appear; but in spring they come in numbers to breed and rear their tiny young in swamps and the lochs. . . . In some of the mountain lakes the teal breed in great numbers. When shooting in August I have seen a perfect cloud of these birds occasionally rise from some grassy loch."

The note of the drake is a whistle, that of the duck a soft subdued quack. The antics of the male at the breeding season, and, indeed,

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throughout the winter, resemble those of the mallard, but are more jerky, and executed with greater rapidity. Without warning he raises himself in the water and curves his neck until the bill touches the breast, emitting the whole time a whistle. Then he jerks the head back and the tail forward so that they meet, and raises the wings slightly. This performance may be repeated several times. The drake is, I believe, a strict monogamist. Although he takes no part in nidification and incubation, he sometimes helps his mate to look after the brood and shows great solicitude for them.

The nest is of the usual duck type, being composed of rushes, flags, reeds, grasses, etc., in fact of whatever vegetation happens to surround it. It contains a quantity of down plucked from the breast of the sitting bird. The nest is usually well concealed and placed on the ground, there is, however, a record of one on an alder stump. According to St. John, a pair of teal, if undisturbed, will return year after year to the same pool for the purpose of nesting.

The nest is generally near water, should this not be the case the young are conducted to it as soon as they emerge from the shell.

St. John describes how he once came upon a mother teal in Ross leading her brood across a road. The eight youngsters could not climb up the bank that bordered the road, and young and old squatted down to allow him to pass. He got off his horse, lifted all the little birds up and carried them down the road to a ditch, the mother bird all the time fluttering about him and frequently coming within reach of his riding whip. The part of the road on which he found the birds passed through thick fir-wood with rank heather.

From eight to twelve eggs are ordinarily laid, but as many as fifteen have been found in a clutch. The eggs are of uniform pale buff, occasionally they are faintly tinted with green.

The female sits closely. Southwell states that in Inverness one permitted him to lift her off her eggs.

There are records of the mother following her brood into captivity. When surprised with her young, the teal seems more often than almost any other bird to behave as though she were injured. We have just noticed the conduct of the mother bird whose chicks St. John took to a ditch. "On one occasion," writes Southwell, "I

disturbed an old teal which was brooding over a large family, and went the old bird fluttering along as if in the last agonies of death, and the young scattered in all directions; but keeping my eye on one particular baby teal, I saw it squat down a few yards off, its neck stretched out and its little body lying close to the ground where some dead leaves were lying. The concealment was so perfect that, had I not actually seen it assume the position, I should most certainly never have detected it, nor did it stir from the spot till I stooped and took it up with my hand."

Such behaviour on the part of young birds is purely instinctive. It is not taught by the parents. Birds hatched in an incubator behave thus when alarmed.

The down of ducklings assimilates to their ordinary surroundings, but not sufficiently to save them from the keen eye of a hawk if they were to move while it was gazing in their direction: hence all young birds capable of locomotion when hatched remain as still as statues at the warning call of the mother. When a chick still in the egg is hammering away at the shell to liberate itself, its strokes cease for a time immediately the mother sounds her note of warning.

Young teal become able to fly about the same time as baby mallard, and in the olden days men went out in search of "flappers" used often to come upon young teal barely capable of flight.

Teal, as we have noticed, thrive in captivity and are to be seen in most collections of duck on the ornamental waters of our parks. A tiny pond of which the area scarce exceeds a square yard, will suffice for them, provided they be given a run of a few square yards. They will not, however, breed unless provided with a larger sheet of water and some rushes or herbage in which the nest may be hidden.

"Much," writes Major M. Portal (*Avicultural Magazine*, July 1913, p. 260), "can be done to increase the numbers of the more uncommon nesting ducks in England, such as gadwall, tufted duck, widgeon and teal, by putting one's surplus young birds—in September—on suitable ponds or lakes, with the feathers of one wing cut. They will not be able to fly until the following July-August, or thereabouts, so will probably have nested—or, if a species does not

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breed the first year, they will have become used to the place and probably stop about and breed next season."

Instructions anent the treatment of waterfowl in captivity are to be found in Mr. Finn's *Fancy Waterfowl*, Miss Hubbard's *Ornamental Waterfowl*, and M. Rogeron's *Les Canards*. Some notes on the subject by Mr. J. Delacour are contained in the *Avicultural Magazine* for January 1928.

According* to Mr. H. S. Gladstone (*Record Bags and Shooting Records*, p. 96) the greatest number of teal shot in one day in the British Isles is 398. This figure has been exceeded in India on many occasions. The following bags of teal have come to the writer's notice: in Bhawalpur, 478 on December 29th, 1924; in Kashmir, 447 on October 18th, 1913 and 528 on November 16th, 1922; in Dholpur, 675 on February 3rd, 1917.

CHAPTER XVIII

THE WIDGEON

THE male widgeon (*Mareca penelope*), when in full dress, is one of the most beautiful of God's creatures. His forehead is a beautiful creamy buff; the rest of the head and the neck are chestnut red. The chin is black and the breast greyish pink. The back and rump appear from a distance uniform French grey. This, as in the case of the mallard, is the effect of black pencillings on a white ground. The brown-and-white wings are embellished by a speculum of brilliant metallic green and black. The belly is pure white, except near the tail where it is black. The bill, which is peculiarly small, is of delicate blue-grey hue. The legs are pure grey.

Even when in eclipse plumage the drake is a handsome bird. He retains the metallic wing-bar and snowy underparts. The prevailing hue of the remainder of the plumage is rich chestnut. The transition from the eclipse to the full dress, as in the case of the mallard, is gradual, and the result of the infusion of pigment into the feathers.

As in the case of many species, the female is quietly arrayed. Her head is reddish brown with dark speckles, her back brown mottled with cream, her breast rust-coloured spotted with brown and her belly white. Her wing usually displays no metallic green band. Her bill and legs are of duller grey than those of the male.

The tail of the widgeon is more pointed than that of most ducks.

The male measures about nineteen inches and the female seventeen. Seen from a distance the plumage of a widgeon resting on the water looks dark like that of the teal. The males are distinguishable from all other ducks by the "blaze" on the forehead, which is creamy buff, sometimes almost golden yellow. When they rear up in the water to flap their wings the white patches on these become very conspicuous.



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During flight the white underpart of the pinion shows up, looking, as a sportsman once remarked, like white satin. Another mark of identification of the male during flight is his peculiar whistling call, consisting of two notes, the first drawn out and the second short. This, as in the case of most other avian sounds, is difficult to reduce to human syllables. One sportsman renders the whistle of the drake widgeon *whew eu*, another *whew-whew*, a third *mee gu*, a fourth *mee-ou*. On account of its call the French style it the whistler, and the country folk in England speak of it as the whew-duck or whewer.

In winter the widgeon occurs in Madeira, Senegambia, Algeria, Morocco, Tunis, the Southern Sahara, along the Nile, in the Soudan, Abyssinia, South Arabia, Mesopotamia, India, South China, Formosa, Hong Kong, and the Philippine Islands. It also occurs on the coasts of America, but the common widgeon of that country belongs to an allied species.

It nests regularly in Northern Asia and throughout Northern Europe, from within the Arctic Circle to Scotland and Holland. It occasionally breeds in England and rarely in France.

Most widgeon are migratory. Large numbers come to the British Isles in September and October and tarry with us until March. Very few, however, winter in France. They pass southwards through that country in October and November and return about February. Many stay there until April, when they move on.

The following are records of the recoveries of marked birds.

<i>Place and Date of Marking</i>	<i>Place and Date of Recovery</i>
Holland, March 1913	Tipperary, January 1915
Holland	Coast of France
Holland July 1910	North Finland, Autumn 1911
Sutherland June 1909	Holland, September 1909
Sutherland, June 1909	River Trent, January 1911
Warwick, October 1915	North Caspian Sea, April 1918

From the above it would seem that some individuals migrate very long distances, while others keep to the United Kingdom.

As with the red, the time of migration of some widgeon seems to be north and south, and of others east and west, the birds nest in

the northern or eastern part of their range. The bird ringed in Holland in July 1910 may have been one of those who migrate from north to south and *vice versa*, and may have journeyed south in the autumn of 1910, and on its return migration in the spring have passed on to North Finland to nest.

Much remains to be discovered relative to the migration of the widgeon, and, indeed, of all species of duck.

Mr. J. C. Phillips writes (*A Natural History of the Ducks*, vol. ii, p. 177): "Everything indicates a definite sex migration in the widgeon, females and young of the year working south first and wintering in the southern parts of the winter range. Old males migrate much later and winter farther north."

The widgeon which visit the British Isles in winter usually appear first off the north-east coast of Scotland and gradually spread over the country, chiefly along the shores. In winter the widgeon is probably the most abundant of the ducks. Of 602 wild-fowl killed by the famous Col. Hawker in eight weeks, 433 were widgeon and 97 geese. Of 1,500 ducks and geese shot by Sir R. Payne-Gallwey off the coast of Ireland one winter, 1,200 were widgeon.

On the coast widgeon assemble in large flocks in estuaries and sheltered bays. In sporting jargon a flock containing a dozen or so of widgeon is styled a *little knob*, one of thirty or forty is a *bunch* or *trip*, while a large flock is known as a *company*. Some idea of the way in which widgeon "pack" may be gathered from the fact that on the British coast over ninety of the birds have been killed by one shot. Off the Dutch coast Captain G. J. Gould, on November 10th, 1898, killed 149 with one shot (*The Gun at Home and Abroad*, p. 406).

In the opinion of many sportsmen coast shooting of widgeon affords better sport than any other kind of wild-fowling. The birds are not easily circumvented at sea. Inland, in India, at any rate, they are comparatively easy to shoot, for, although they rise quickly off the water and are swift on the wing, they lie up among reeds which afford good cover to the gunner.

Although widgeon seem to live and feed by preference on salt water, they are quite at home on fresh water. Sir Ralph Payne-

THE WIDGEON

Gallwey states (The Badminton Library *Shooting*, p 175) that on the Ashby decoy in Lincolnshire, out of 90,000 duck taken in thirty-five years, 2,000 were widgeon

The above figures probably reflect tolerably accurately the relative proportion widgeon bear to other sporting wild fowl on the coast and inland At sea, from 60 to 80 per cent of the duck are widgeon, inland the figure is a little over two per cent I have no statistics regarding the coasts of India, but nowhere inland at a distance of more than three hundred miles from the sea do the widgeon contribute as much as two per cent of an average bag of duck Widgeon are able to ride the waves more easily than mallard Often, when the latter are driven by the disturbed water to the shore or the mouth of a river the widgeon remain out in the open sea

Although widgeon partake of animal food, they are mainly vegetarians and this doubtless accounts for their excellent flavour They graze like geese On the coast they subsist largely on sea grass (*Zostera*) Inland they feed on ordinary grass Rogeron kept widgeon in perfect health for years on no food other than that provided by a lawn

Waterton, who refrained from shooting water-fowl on his estate, describes how one day he saw from his study window above one hundred widgeon and thirty coots under some large elms, feeding on the grass which there was not covered with snow

The display of the widgeon during the nesting season consists of the humping of the back, the raising of the wings and the depressing of the tail

Apparently it is only within the last century that the widgeon has nested within the British Isles Mr J G Millais writes (*Natural History of the Surface Feeding Ducks*, p 40) "We first heard of the nesting of widgeon in Scotland in 1834 In the 'sixties it was found to be breeding in Ross and Sutherland In 1886 it was first found nesting in the south of Scotland The species may now be considered an established resident from Caithness to Selkirkshire It breeds in various parts of Ireland In 1895 a pair nested in Yorkshire"

Thanks to the efforts of Mr St Quintin and Sir Richard Graham, the bird seems now to be established as a breeder in England

The method adopted by the latter is to catch ducks in decoys, clip their wings and keep them in an enclosure until a short time before the breeding season, when the stumps of the flight feathers are pulled and the birds returned to their enclosure. In three or four weeks they are again able to fly, but by that time the desire to migrate has become subordinated to the breeding instinct. Mr. St. Quintin pinioned the widgeon he caught. Some of these bred, and their offspring, although free-flying, remained in the locality. As has been remarked, the migratory instinct of ducks seems far less powerful than that of swallows and swifts.

The nest is on the ground usually, but not invariably, near water. Mr. Collet records finding one under a juniper bush on the fells near Lillehammer, about half a mile from water. One used to nest in a flower-bed in the Zoological Gardens, London.

The nest generally consists of the stems of water-plants, with moss, and down plucked from the duck's breast. As in the case of most ducks, the female covers the eggs when she goes off to feed. The eggs are usually laid in the latter part of May and June. The average number in the clutch is nine, but as many as twelve may be laid. The hen alone sits. Incubation occupies twenty-three or twenty-four days. The drakes often congregate in small companies while their mates are busy at the nest.

CHAPTER XIX

THE POCHARD

DUCKS may be divided into two classes: those that habitually dive for food, and those which do not.

These are often spoken of as diving ducks and surface-feeding ducks. These designations, while convenient, are open to the objection that the divers often feed on the surface and the non-divers can dive and do so when the necessity arises.

The three ducks we have already considered are surface-feeding species. The pochard (*Nyroca ferma*) is a diver.

The feet of the diving ducks differ in structure from those of the surface-feeders. In the former the outer of the three front toes is as long as the middle one: this is not so in the case of the latter.

In all ducks the fourth or hind toe springs from the leg at a higher level than the others, is considerably shorter, and points backwards.

In the surface-feeders it is very small; in the divers it is comparatively large, has on the under side a lobe, and is flanged at the side. These features doubtless assist the bird when diving or swimming under water.

Nor is this the only adaptation to submarine habits which the pochard and other diving ducks exhibit.

The legs are set far back: in consequence the gait of the bird on land is awkward and the body has then to be carried more erect than that of a surface-feeding duck. The legs and feet, although ill adapted to walking, are perfect paddles. They are articulated so that they can move with equal ease backwards and forwards, and outwards and inwards.

"The pochard," writes Rogeron (*Les Canards*, p. 320), "is a fine bird, but it is not made to be looked at on land, where its portly body and painful gait are far from becoming, but on the water it is

elegance and ease personified. One feels that there it is in its element, especially when it dives, which it does with the greatest facility, almost without disturbing the water. After it has disappeared only a little eddy is perceptible."

Expert diver though it be, the pochard has not the speed under water of the smew: the former dives only for vegetation, the latter catches fish.

Another adaptation to the diving habit is the short dense plumage. So close-set are the feathers of the pochard and its allies that the plumage has much the appearance of fur. By merely running the hand over the plumage it is possible to distinguish a diving from a surface-feeding duck.

The wings and tail of a diving duck are short, the former being, like the legs, placed far back in the body.

The head is large and the body of squat build.

Speaking generally, the colouring of the diving ducks is quite unlike that of the surface-feeders. In the majority of the latter the sexes differ in appearance; in the divers they invariably do so.

The plumage of a diver rarely exhibits much bright colouring. Black and white preponderate in that of most of the males, and brown and white in that of the females.

In many of the surface-feeding ducks the females, and in a few the males also, have mottled plumage like that of the female mallard or teal; this is not exhibited by any of the diving ducks. Many of the surface-feeders display a highly coloured wing band, usually green or blue. The only diving duck which exhibits a bright coloured wing band is, I believe, the curious New Guinea species known as Salvadori's duck. The majority of divers have either no wing bar or a white one.

The pochard is about the size of a widgeon, but is a heavier bird. The colour of the drake is peculiar, the three hues displayed by the body plumage being strictly segregated and each sharply marked off from the other. The head and neck are dark chestnut, the breast is black, as is a patch under the tail, the intervening plumage is grey, this hue, as in the case of the widgeon and the mallard, being the effect of fine wavy lines on a white background. The colour scheme

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extends to the bill which is grey in the middle and black at the ends. The feet are grey. The eyes are typically red. When seen on the wing, the pochard appears to have a white body and black head and tail.

As the result of the summer moult, the drake becomes for a time dull red except the breast which is grey.

The head, breast and upper back of the duck are dull brown tinged with red on the crown and fading into cream on the throat and sides of the head. Her tail is brown and her belly creamy white, the remainder of the plumage is grey, of duller hue than that of the drake. This applies also to the grey of the bill.

The range of the pochard is more restricted than that of any of the ducks we have considered. Its breeding area is a broad strip of country beginning at the British Isles and ending in Western Asia. The pochard does not seem ordinarily to nest as far north as Norway or farther south than Roumania. Sedlitz, however, asserts that a colony of pochards breeds on Lake Fitzara in Algiers. This is rather surprising in view of the fact that every pochard leaves India to breed and that the species does not ordinarily nest in Italy, Spain or even France. Why do the pochard that winter in those countries depart at the nesting season? I think that the reason is that the birds dislike heat. It must, however, be admitted that pochard thrive well in captivity during the hot weather in India, but from this it does not follow that they enjoy the high temperatures to which they are subjected.

Mr F. Finn suggests that the pochard and other migratory duck leave India at the approach of the nesting season on account of the large numbers of creatures that prey upon ground nesting birds in that country. But this does not seem to explain why pochard do not nest in Spain and Italy. Moreover, the mallard sometimes nests in holes in trees. If, then, the number of creatures that prey upon ground nesting birds is the reason for migration in spring, we should have expected a race of mallards which nested in holes in trees to have arisen in India.

The winter range of the pochard is considerably greater than its breeding area. It extends not only much farther south, but a little farther north—a very unusual feature. Most species tend to spread

cealed. Like that of many other ducks, it is composed of sedge and dried grass and lined with down from the bird's breast, which is used to cover the eggs while the female is absent. She alone constructs the nest and incubates the eggs.

During the later stages of incubation the drakes live in small parties. The average number of eggs laid is between eight and nine, but as many as fifteen have been found in one nest. The hen sits very close and will sometimes allow a human being to stroke her when on the nest. Incubation takes about twenty-four days.

Like the surface-feeding ducks, pochard are taken in decoys, but owing to their diving habits special arrangements for catching them have to be made. They are by no means welcome visitors to the ordinary decoys, for by their diving they disturb the other waterfowl and prevent their being enticed into the tunnels.

"A decoy for dun birds," wrote Daniel (*Rural Sports*, vol. iii, p. 281), "is called a flight-pond, and has nets fastened to tall stout poles, twenty-eight or thirty feet long. At the bottom of each pole is fixed a box, filled with heavy stones, sufficient to elevate the poles and nets the instant an iron pin is withdrawn, which retains the nets and poles flat upon the reeds, small willow boughs, or furze. Within the nets are small pens, made of reeds about three feet high, for the reception of the birds that strike against the nets and fall down; and such is the form and shortness of the wing of the pochard, that they cannot ascend again from these little enclosures if they would. Besides, the numbers which are usually knocked into these pens preclude all chance of escape from them by the wing. A decoy-man will sometimes allow the haunt of dun birds to be so great that the whole surface of the pond shall be covered with them previous to his attempting to take one. Upon such occasions he bespeaks all the assistance he can get to complete the slaughter by breaking their necks. When all is ready the dun birds are roused from the pond, and, as all wild-fowl rise against the wind, the poles in that quarter are unpinning, and fly up with the nets at the instant the dun birds begin to leave the surface of the water, so as to meet them in their first ascent, and they are thus beat down by hundreds." He adds that at the pond of Mr. Baxton, at Goldhanger, in Essex.

• THE POCHARD

as many pochards have been taken at one drop as filled a wagon so as to require four stout horses to draw it.

Although such numbers of pochard used to be caught in decoys, I have come upon no records of large bags made by sportsmen. On February 4th, 1922, 69 were shot at Bhawalpur in India. I have no information of any bag bigger than this.

CHAPTER XX

A KEY TO THE WILD-FOWL OF THE BRITISH ISLES

THE wild-fowl constitute a considerable portion of the avifauna of the British Isles.

To devote a chapter to each of the ducks, geese and swans found in our country would involve the expansion of the present book to twice its present size. Many of these birds are not good to eat, and so do not come within our definition of game birds.

On the other hand, the failure to describe some of them would mean the exclusion from the ambit of this work of a number of good game birds, notably the pintail duck, gadwall, garganey teal, brent and grey-lag geese.

An attempt, therefore, has been made to strike a mean between prolixity and incompleteness by giving a brief description of each kind of water-fowl which a sportsman is likely to encounter. It is hoped that this will afford a sufficient means of identification.

Rare birds, that is to say, species of which an individual has been seen once in ten or twenty years, are excluded.

It would complicate unnecessarily the keys that follow to include in them the Harlequin Duck, Steller's Eider, the King Eider, Surf Scoter, American Teal, White-eyed Duck, Red-crested Pochard, Buffel-headed Duck, Snow Goose, Red-breasted Goose, Canada Goose and American Swan. The above have all been shot in the British Isles. In some cases the birds seem to have been those which had escaped from captivity.

KEY TO THE DUCKS OF THE BRITISH ISLES

- I. No band or bar on wing.
 - A. Tail long and pointed.
 - (a) Some black on head; tail very long
 - (b) No black on head

Long-tailed Duck (male).
Pintail (female) (see also
II below).

GAME BIRDS

(3) Bill black or dark brown

(i) White eyebrow

Garganey Teal.

(ii) No white eyebrow

(a) Tail long and pointed

Pintail.

(b) Tail short

Teal.

BRIEF DESCRIPTION OF THE BRITISH DUCKS

LONG-TAILED DUCK (*Harelda glacialis*). The attenuated eight-inch-long tail renders the identification of the adult male easy, but the tail is not unusually long in the female or young male. The peculiar cry of this sea duck has been syllabised "Coal and candle light." A winter visitor.

Male. Forehead and sides of head reddish grey. Oval black spot on neck. Back and middle tail feathers black. Remainder of plumage white.

Female. Dark brown above, streaked with pale brown on back. Face, throat, necklace and under parts white.

SCOTER (*Edemia nigra*). The common black sea duck.

Male. Plumage glossy black. Bill bright orange, tipped with black, and with a black knob at the base.

Female. Dark brown above. Chin and throat white. Rest of plumage mottled grey. No knob at base of bill.

POCHARD. See chapter on pochard.

EIDER DUCK (*Somateria molissima*). A large and heavy sea duck. Distinguished from all other ducks by the feathering on each side of bill. There are two stripes of bare skin on the forehead.

Male. Very handsome. Top of head, lower parts, tail and flight feathers velvety black. Upper neck pale green. Rest of plumage white, tinted with russet on breast and back.

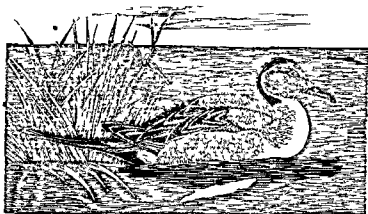
Female. Mottled brown. Some individuals display two white wing bars.

PINTAIL (*Dafila acuta*). The sea-pheasant of poulterers. Occurs on both salt and fresh water. Beautifully shaped. Tail long and tapering.

A. KEY TO THE WILD-FOWL OF THE BRITISH ISLES -

Male. Head and upper part of fore-neck umber brown. White band,* pointed at upper end, down each side of neck running into the white breast and lower parts. Back grey.

Female. Mottled grey brown. Distinguished from other mottled ducks by the tail feathers being cross-barred.



PINTAIL DUCK

GARGANEY TEAL or **BLUB-WINGED TEAL** (*Querquedula querquedula*). A fresh-water duck.

Male. Very handsome. Crown and nape dark brown. Broad white eyebrows meeting at back of neck. Breast chocolate brown, barred with pale cream. Flanks grey. Front part of wing bluish grey, hence the name blue-winged teal.

Female. Upper plumage mottled brown. Lower parts white. White eyebrow. White line below eye. Wing brown with two indistinct white bars.

GOLDEN-EYE (*Glaucionetta clangula*). Mainly a sea duck.

Male. Head and short bushy crest dark glossy green. Large round white patch on each cheek touching bill in front. Rest of plumage black, except chin, throat, patch on wing and one on shoulder which are white.

Female. Lacks white cheek patch. Has white collar. Upper breast grey, abdomen white, rest of plumage dark brown

GAME BIRDS

TUFTED DUCK (*Nyroca fuligula*). Mainly a fresh-water duck. *Male*. Black and white, plumage pattern like that of magpie. Crest recumbent.

Female. Brown where male is black. Much less white on flanks.

SCAUP (*Nyroca marilla*). Equally at home on fresh and salt water. Appearance coarse and heavy.

Male. Head and neck black, glossed with green. Breast and rump black. Wings and tail dark brown. Abdomen and flanks white. Back and shoulders grey.

Female. Head, neck, breast, wings and tail brown. Band across lower forehead and abdomen white. Back and shoulders grey.

VELVET SCOTER (*Edemia fusca*). A sea duck.

Male. Plumage velvety black, with a white patch on the cheek and a white wing band. The colour scheme is thus like that of the blackcock. In Norway the bird is known as the sea blackcock. There is a black knob at the base of the bill. The sides of the bill are black, the nail red and the rest yellow. Legs red.

Female. Brown where male is black. No knob at base of bill. Legs yellow.

GADWALL (*Chaulelasmus streperus*). A fresh-water duck. Sexes differ in appearance, but both have sombre plumage. Easiest means of identification are the legs and feet which are dirty-looking yellow with black webs.

Male. Head reddish brown spotted with black. Lower neck upper back, shoulders and breast elegantly marked with black and white crescents. Rump black. Tail ashy, edged with white.

Female. Mottled brown. Bill orange with central black streak. Like female mallard except for colouring of wings and feet.

TEAL. See chapter on Teal.

WIDGEON. See chapter on Widgeon.

SHOVELLER (*Spatula clypeata*). A fresh-water duck. Readily distinguishable from all other ducks by the coarse spatulate bill, the tip being broader than the base. Legs and feet reddish orange.

Male. Head and neck glossy metallic green. Breast white. Belly chestnut.

Female. Mottled brown.